THE IRON AGE

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Steam Generation for Large Rolling Mills.

BY J. R. BIBBINS.

One of the oldest and most prosperous concerns whose name and business operations have been most intimately associated with the development of the iron and steel industry in this country since its very infancy is the Lukens Iron & Steel Company of Coatesville, Pa. This company have in the past made an entire specialty of large plate work and their future operations along this branch of the industry will be greatly facilitated by the addition to their present equipment of several large slabbing and rolling mills. Part of this new equipment has recently reached completion, while the remaining portion is now under construction.

The steam power necessary for the operation of the heavy machinery involved in the various processes is supplied by separate boiler plants designed especially for the severe service which they will be called upon to perform. One of these boiler plants, the last to be put in commission, embodies such novel constructive features as to merit an extended description.

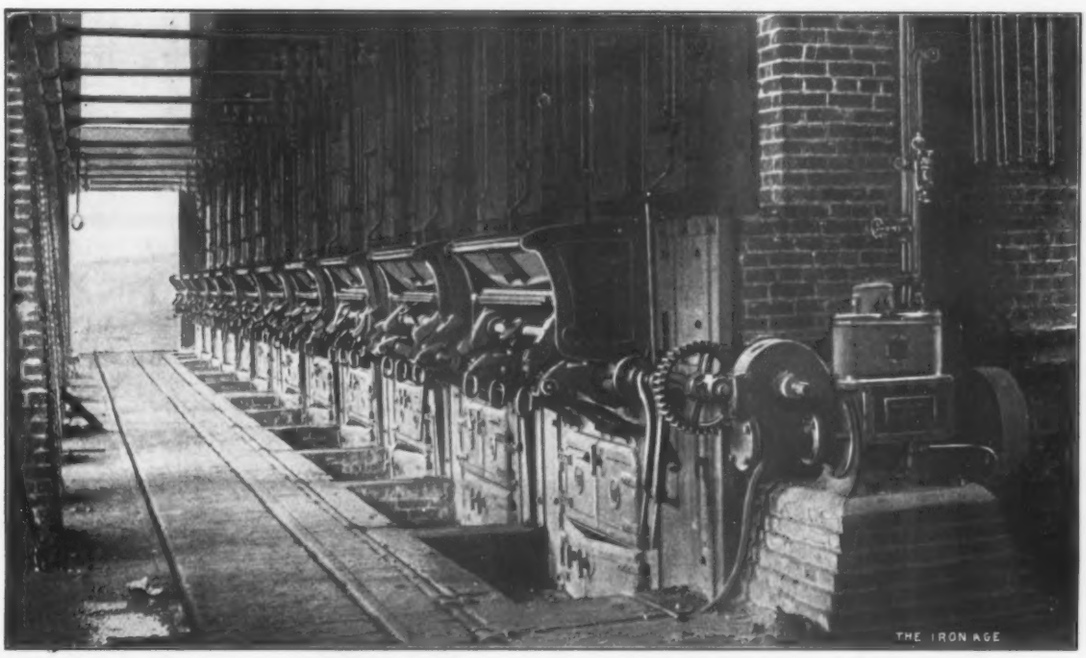
The entire equipment was designed and installed by Westinghouse, Church, Kerr & Co., New York, and has been in successful operation for about nine months. The steam furnished by this plant is mainly utilized in one of the newly erected slabbing mills mentioned above, which is situated at a short distance from the boiler house, the steam being conducted upon an elevated trestle across the intervening space between the shops through heavily lagged piping.

The design of the boiler plant provides for a capacity of 3600 horse-power uniformly distributed among 24 horizontal return tubular boilers of 150 horse-power each. These are arranged in two batteries of 12 boilers each, located on either side of a central cross compartment or gallery of liberal dimensions and provided with additional head room beneath the roof girders for the accommodation of mechanical draft apparatus.

Mechanical Stokers.

The entire boiler plant is equipped with Roney mechanical stokers and smokeless furnaces, Fig. 1. Each battery of 12 stokers is operated by two small Westinghouse standard engines, located at the opposite end of the battery, and the mechanical gearing is so arranged that either engine may be shut down when necessary for repairs and the entire battery operated from the remaining engine.

Two features were introduced in this installation which are worthy of especial notice—viz., the employment of mechanical draft and economizers. These features are not uncommon in large and elaborately designed power plants where the highest economy in fuel consumption is an important factor in the successful operation of the station, due to the comparatively high cost of real estate, buildings and fuel supply. In the iron and steel districts, however, whose proximity to extensive coal deposits renders the acquirement of a cheap fuel supply a comparatively unimportant consideration, such refinements in plant design are not usually considered necessary. That this conclusion is at variance with actual facts and results is fully attested in the operation of the plant under description.

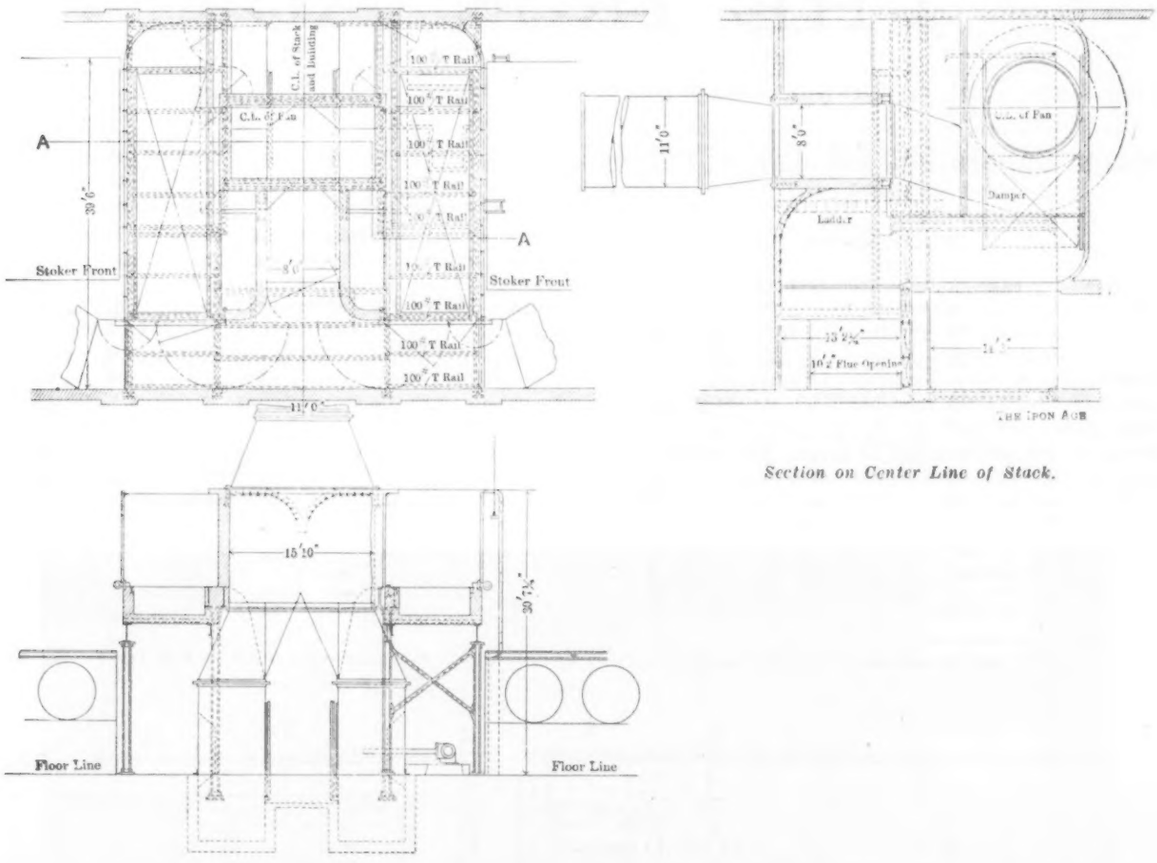


Front View of One Battery, Showing Mechanical Stokers.

Mechanical Draft.

The induced draft pressure necessary for the operation of the boiler plant is furnished by two 14-foot steel plate exhaust fans, Figs. 2, 4, 5 and 6, resting upon suitable foundations in the gallery between the two batteries of boilers as mentioned above. The fans revolve in parallel planes, and are separated by a space of approximately 8 feet in width, Fig. 2, forming a collecting chamber which connects with the economizers and bypasses from the main boiler flues. The fans are oper-

ated by special 12 x 16 inch slow speed direct connected simple engines, which are easily accessible from the boiler room floor. The fan intakes are 10 feet in diameter, opening directly opposite each other into this collecting chamber, and are provided with sliding dampers controlled from the boiler room floor by means of chain gearing and hand wheel. The fan outlets discharge into short steel plate uptakes, which converge to a special steel reducing section, this in turn connecting by means of flanged joints to a short section of steel stack 11 feet in diameter and extending but a few feet above the water shed, or 56 feet above the boiler room floor.



Section on Center Line of Stack.

Section on Line A A.

Fig. 2.—Arrangement of Economizers and Fans.

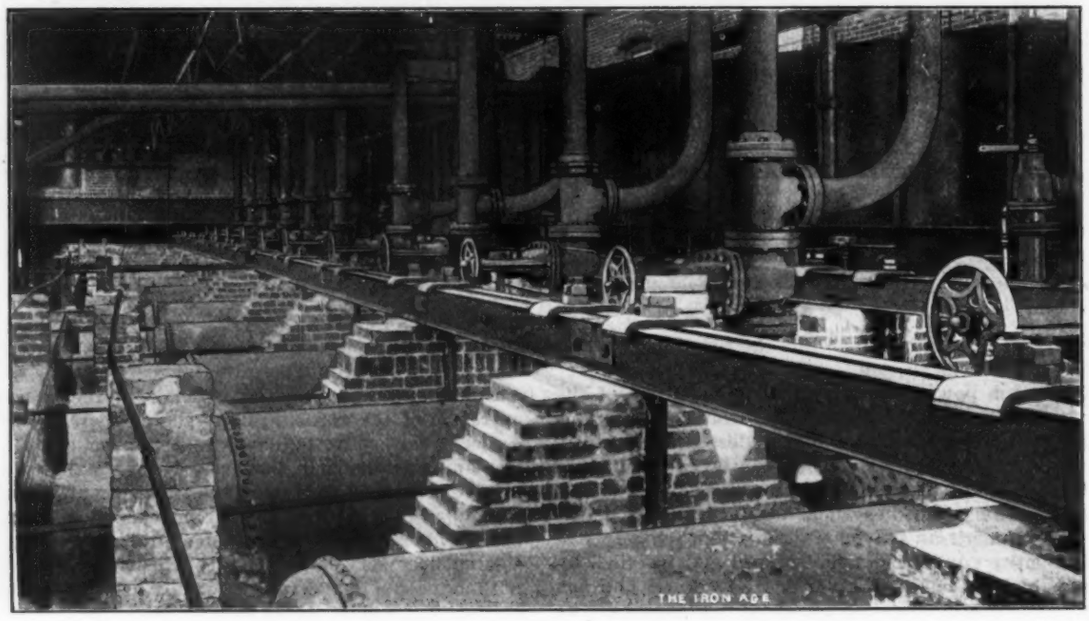


Fig. 3.—Steam Piping, Flues, Economizer, Setting and Superstructure of Boilers Before Completion of Setting.

STEAM GENERATION FOR LARGE ROLLING MILLS.

The exhaust fans are of heavy steel plate construction, built after special designs of Westinghouse, Church,

Kerr & Co. They are of the overhung type, being entirely sealed upon the side opposite the intake. All engine bed plates rest upon a steel grillage imbedded in the concrete floor, which also receives the lower part of the fan housing, thus preserving perfect alignment. The fan wheel or inductor consists of a split cast iron hub, bolted together and keyed to the overhang on the engine shaft. Into this hub are cast 12 arms, forming the spider, to which are riveted curved steel flights.

tion to take up longitudinal strains in the flue due to changes in temperature.

Two sections of the main flue converge and discharge into a collecting chamber immediately opposite to and above the exhaust fans. From this chamber three exits are available for the gases, each controlled by a suitable damper. When the economizers are in service each section of the flue will discharge its gases into an economizer located upon a level with the top of the boiler.

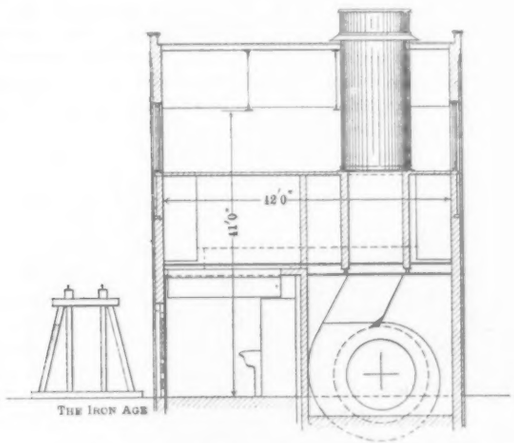


Fig. 4.—Section on Line A B of Fig. 6.

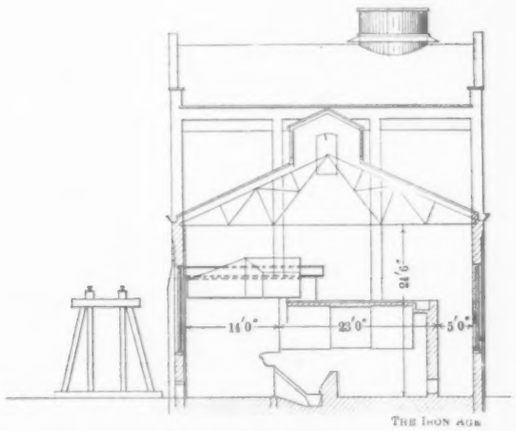


Fig. 5.—Section on Line C D of Fig. 6.

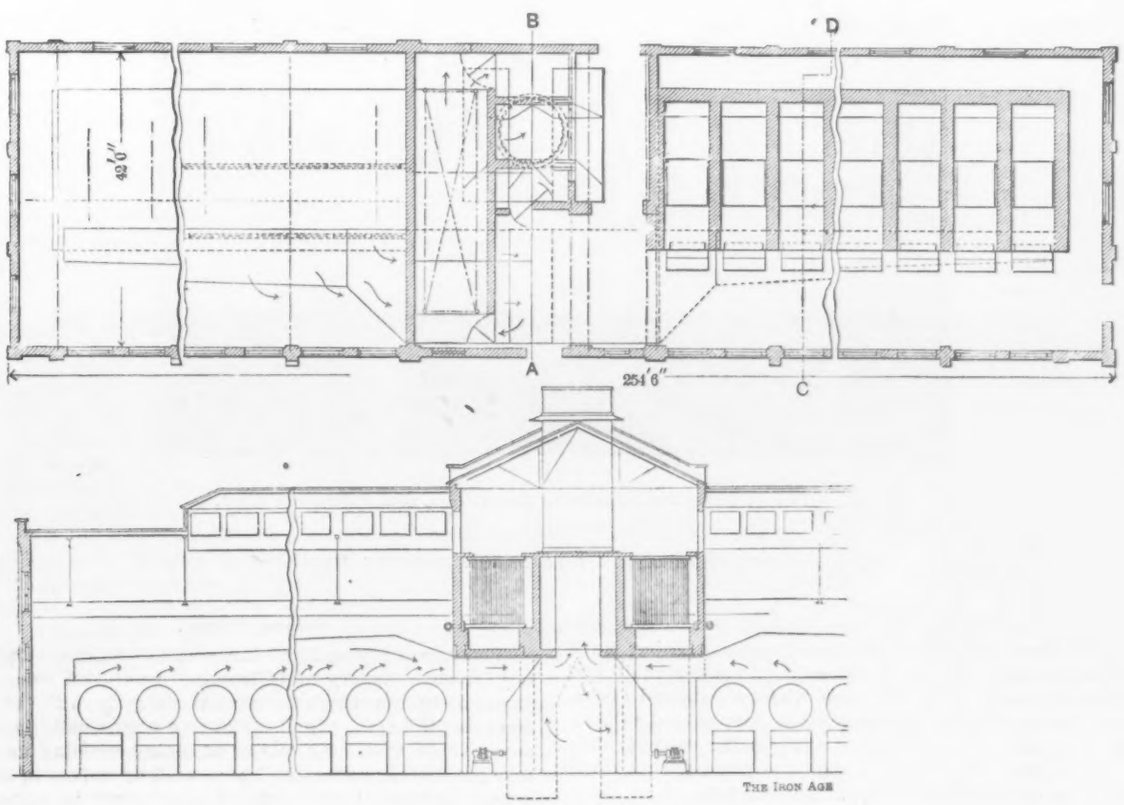


Fig. 6.—Sectional Plan and Elevation of Part of Plant.

STEAM GENERATION FOR LARGE ROLLING MILLS.

Each of the two sections of the main boiler flue, Fig. 6, is of a rectangular cross section, increasing uniformly from 9 to 18 square feet in area and receiving in succession the gases from 12 boilers through short connecting flues of elliptical cross section. The extreme length of these flues necessitates the introduction of an expansion joint midway between the extremities, which is simply an enlargement of the flue section, the periphery being formed by a 4-inch channel bent to conform with the rectangular section. The opposing faces of the enlargement are of sheet steel and provide for sufficient deflec-

Fig. 3, thence into an inclined flue leading to the before mentioned fan inlet chamber on the boiler floor, and thence through the fans directly to the stack. In the event of one economizer being out of commission for cleaning or repairs the dampers leading thereto are closed and the gases from all the boilers pass through the collecting chamber to the remaining economizer and thence to the fans. When both economizer equipments are out of commission their respective inlets are closed, and all the gases pass directly to the fan collecting chamber by a by-pass flue and thence by way of either

or both fans to the stack. Under normal conditions the arrangement of the mechanical draft apparatus permits regular inspection and repair of one entire set of economizers and fans without disturbing the other set, each fan being of sufficient capacity to furnish the requisite draft for the entire boiler plant. These arrangements are obviously entirely reversible and provide for the continuous operation of the boiler equipment or a portion thereof, with one of the two fan outfits always in reserve. The entire mechanical draft apparatus including flues, fan housings, uptakes and stack, is constructed of sheet steel reinforced by suitable structural steel sections, such as angles, channels, &c. Elevated and otherwise unsupported portions of the main flues are swung by appropriate hangers to the lower chord of the roof trusses. Dampers are controlled from the boiler floor by pendent chains with the exception of the sliding dampers controlling the fan intakes. These are suspended from roller hangers running upon a Z bar track and are retained in any position by an endless chain and sprocket operated by the hand wheel mentioned above. The mechanical draft equipment is guaranteed to handle the gases from 3600 horse-power boiler capacity during a 50 per cent. overload upon the plant with a draft pressure of not less than ¾ inch at the fans.

Economizers.

The economizers, Fig. 2, of which there are two, are of the high pressure circulating type, each designed to heat the feed water for 12 boilers. Each economizer consists of 44 sections of 12 pipes each, having an aggregate heating surface of 5300 square feet. The sections are connected at top and bottom by cast iron manifold headers so constructed as to maintain positive circulation at all times. This is accomplished by the arrangement of the various sections in a series instead of a parallel system, thus avoiding the short circuiting of circulating water from point of entry to that of exit, which in other types materially reduces the heating capacity of the economizers. A sectional asbestos lined steel casing is employed in place of the usual brick casing, the former being lighter, more durable, a better non-conductor of heat, and provides access to any number of tube sections by the removal of the immediate casing section. The economizers are provided with reciprocating scrapers actuated from an auxiliary shaft which is belted directly to the fan engines.

The entire weight of the economizers and stack connections is carried by four channel box columns surmounted by a steel framework, upon which also rests the uptake reducing section and stack. The space provided beneath the economizers is thus left clear for the reception of fan and stoker engines.

The mechanical draft gallery is provided with a raised roof supported by latticed girders. To the under side of these girders and directly over each economizer is secured an 8-inch I-beam furnished with a simple I-beam trolley, which is made use of during the cleaning and repair of the economizers.

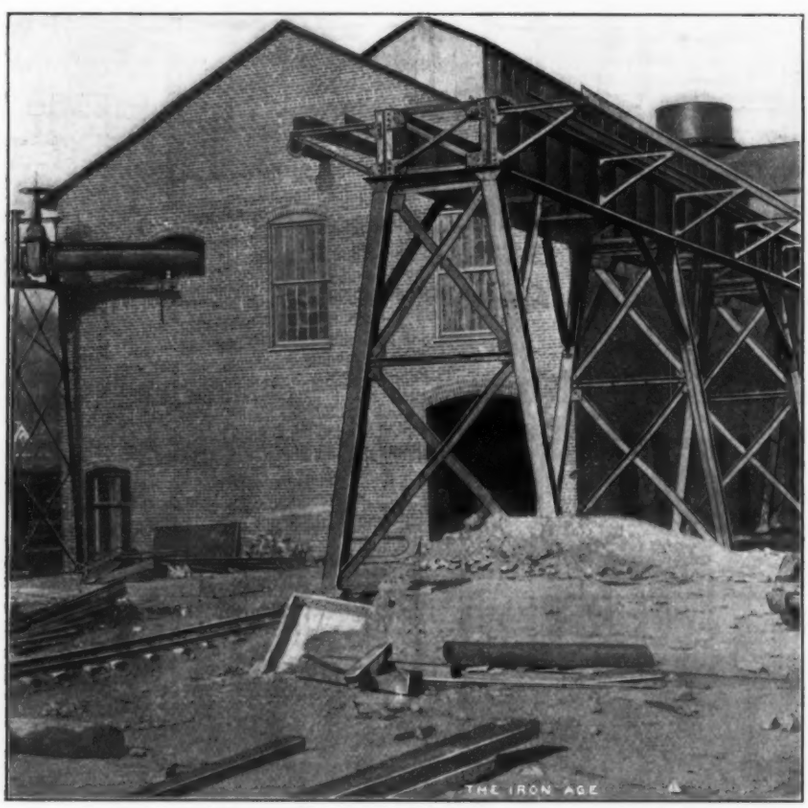


Fig. 7.—View of Boiler House, Showing Steam Main, Coal Siding and Stack.

STEAM GENERATION FOR LARGE ROLLING MILLS.

Steam Piping.

The steam piping is of the simplest design, employing for each battery of boilers the usual high pressure steam main into which the various risers from the boiler headers discharge, Fig. 3. The two mains unite in one larger main extending to the adjoining building as before mentioned, and each is sectioned by valves in such a manner that in the event of an accident to any section or to one of the three boilers directly controlled the crippled boiler or section may be immediately isolated.

All condensation from piping, traps, separators, &c., is returned to the boilers by means of a Holly gravity return system. This system requires no pumps, traps or other circulating apparatus, but is entirely automatic and positive in its action and may be located in any out of the way place that may be available for the purpose.

Coal Supply.

Excellent facilities for handling the coal supply are available in connection with the general system of fuel supply in use in other parts of the Lukens properties. Coal arriving in gondola cars is run in upon an elevated siding, Fig. 7, paralleling the boiler house and dumped underneath the trestle, directly opposite numerous openings in the boiler room wall, provided for the pur-

pose of obtaining access to the fuel supply. The trestle is of structural steel, and the space beneath affords a coal storage of considerable capacity, while its location close to the boiler room permits direct shoveling into the stoker hoppers.

Buildings.

The boiler house is a rectangular brick structure 260 x 40 feet, and is 30 feet in the clear to the trusses. The roof is supported by Fink trusses, resting upon suitable brick pilasters. The building is lighted throughout its length by a monitor in addition to the windows and other necessary openings. In the rear of the boilers a 4-foot passage is provided for access to feed water piping, blow off valves, &c., and in the front a 10½-foot passageway gives ample room for operating the stokers. A large cement lined ash pit is provided under each boiler, from which ashes are removed and conveyed to the dump in small ash cans running upon an industrial way.

This boiler plant has been in continuous operation for a period of nine months, and the service rendered has been of the most satisfactory character, as attested by the absence of shut downs or accidents of any nature. As a result of this record the Lukens Company have awarded Westinghouse, Church, Kerr & Co. a second contract for a complete boiler plant for similar duty in connection with another large steel plate mill now under construction. The design employed in the boiler plant described above will be to a large extent followed in the new plant, and it is believed that the special features which have proven of such value in the first installation will be repeated with similar success in the second.

The completion of these various additions to their already extensive properties will provide the Lukens Company with one of the most elaborately equipped steel plants in the country, and will enable them to supply the market with steel plate work of the largest dimensions. The company deserve much credit for taking the initiative in the adoption of new and modern methods throughout their plants, and their example might well be emulated by other concerns operating along similar lines who have not given as much attention to the vital question of efficiency and economy in the steam generating part of their plants.

The Ruthenberg Electric Iron Process.

One of the interesting papers read before the American Electro-Chemical Society at its second annual gathering at Niagara Falls last week was on the subject of "Developments in Electrometallurgy of Iron and Steel." The author of the paper was Marcus Ruthenberg of Philadelphia, in whose absence the paper was read to the convention by Dr. Edward Hart of Easton, Pa.

Mr. Ruthenberg refers to the magnetic concentration of low grade magnetites and the efforts to briquette the concentrates in order to prepare them for the blast furnace, and then describes his own method:

In strong contrast to the above enumerated methods of handling these fine ores or concentrates is the method that I have had in use for upward of a year. It consists in taking the concentrates cleaned up to the highest point of possible purity, and putting them through an electric furnace, the melting zone of which is a magnetic field. The ore being magnetic, the magnetic field grabs and holds the grains of magnetite, and the polar projection of this magnetic field being at the same time the electrodes of the smelting circuit, the magnetic bridge thus formed by the ore forms a high resistance in the smelting circuit. The heat of the smelting circuit, therefore, is engendered within this bridge of ore itself. The electrodes are water cooled and play no part in the melting other than to conduct the current to the ore. The moment that the ore melts it loses its magnetism, and gathering weight from new molten material being added to it it falls out of the magnetic field, its place being taken by fresh portions of ore from above. The result of this operation is agglomerated, coherent masses, ranging in size from a bean to a walnut, that are hard, strong, tough and porous, differing in analysis in no way from the ore, prior to its agglomeration except for the absence of moisture and the last traces of sulphur. The product is an ideal condition for use in the blast furnace.

If a reducing material, such as powdered coke dust or charcoal dust, be added to the charge prior to its introduction to the electric furnace, a partial reduction takes place and the fritted mass of carbonaceous dust and iron ore, partially reduced, is dropped into a soaking pit. If allowed to remain in this soaking pit a proper length of time cementation takes place through the action of the heat left in the ore by the electric furnace, and the action of the carbon fritted into the mass, which results in producing reduced metal, which may be properly termed steel. Any slag forming material remaining in the ore through imperfect magnetic concentration remains with the metal. These materials in any event are comparatively small in quantity, and are just what is wanted to protect the bath of molten metal in the open hearth from the scorifying effect of the furnace. This material from the soaking pits is ideal for melting in the open hearth furnace. It thus becomes possible to produce first-class steel direct from the ore through the intermediary of the electric furnace and the soaking pits in the form of spongy iron or steel ready for immediate melting in the open hearth without the intervention of the blast furnace in any part. The blast furnace, while well recognized as an economical machine, is essentially a concentrator, eliminating the gangue of the ore, the limestone and the ash of the coke as a cinder or slag. It costs far less to grind and magnetically concentrate for the removal of the gangue. The blast furnace also has the disadvantage of driving whatever phosphorus there may be in the ore into the resultant pig iron. The removal from the ore of this metal by magnetic concentration is a decided advantage over the blast furnace. It may be as well also to remember the fact that the limestone and fuel charge are never entirely free from sulphur and phosphorus, which in the action of the furnace are driven into the resultant pig iron, the phosphorus entirely and the sulphur partially. In the electric reduction limestone is practically absent, fuel in contact with the charge is lacking, and reducing material necessary for the elimination of the oxygen of the ore is small in quantity and may therefore be selected of exceptional purity without regard to its enhanced cost. Anything that will burn may be used for fuel to generate the electric current, which is the source of heat to be utilized in the reducing and melting of your ore. If water powers of magnitude be available they are sources of energy convertible into heat units not to be ignored.

In connection with this subject it may not be amiss to speak of one class of ore which has attracted attention for many years, but no advantageous method has been put forward of handling it. I refer to ferruginous beach sands. These occur in many parts of the world, the most notable being those of the St. Lawrence River and the Pacific Coast of the United States. They also occur of greater or less richness in the West India Islands and Australia. An almost universal accompaniment of the magnetite in these beaches is titanium. The titanium generally occurs in separate grains of ilmenite. The ilmenite is less magnetic than the magnetite, and by gauging the strength of the magnets they may be made to take magnetite and leave the ilmenite. These beach sands may readily be concentrated up to 71 per cent. of magnetic iron out of the possible 72.40 per cent. The sulphur and phosphorus are almost invariably low, and these sands make one of the most inviting fields for this kind of work.

Theoretically it has been stated by various authorities that it takes from 3000 to 3500 K. W. H., to melt a ton of iron ore electrically. In my experience I have succeeded in performing this fritting operation, either with or without reducing agents, with an expenditure of something less than 500 K. W. H. Every ore, of course, is a distinct proposition in itself, but there are few ores that will not stand the cost of this method of treatment.

In the discussion that followed, Dr. Hart expressed the idea that the author of the paper was too sanguine, perhaps, that the smelting of iron by the electric furnace was a serious proposition. Dr. Nathaniel S. Keith of New York believed in the utility of preparing the ores,

but the necessity of economy absolutely prohibited it at present. To Woolsey McA. Johnson, New Brighton, S. I., it seemed that the metallurgical product of steel must be better to compensate for cost, that it must be of the grade of crucible steel. The efforts of Thomas A. Edison were referred to by several of the speakers. Pedro G. Salom of Philadlphia did not see any danger of the electric furnace superseding the blast furnace. The possibilities were not, however, to be ignored. He pointed out that it takes about 300 pounds of carbon to reduce a ton of iron at present, and that in the best blast furnaces it requires a ton of fuel (coke) for a ton of iron, which is seven times the amount first stated. He thought that all attempts at concentraion would fail until high grade ores become scarce, as nobody wanted to treat ores of 5 and 10 per cent. while they could get ores of 60 per cent.

The Care of Locomotive and Car Scrap.*

BY T. A. LAWES, DANVILLE, ILL.

The economical assortment and disposition of scrap at locomotive and car shops have been pursued on widely varying plans. One of the most primitive methods is to bring the scrap to some convenient place and throw it unassorted on the ground. It is then assorted when loaded for shipment to purchasers. It is wheeled to the cars in barrows and lifted up to the floor by "main strength," and laborers in the car transfer it by hand and wheelbarrows to ends of car.

To supplant such methods a scrap bin was constructed several years ago which may prove of interest. In it is handled the scrap from the locomotive and car departments of a road having 140 engines and 11,000 cars and making monthly shipments of scrap.

The scrap bin has a length of 258 feet and a width of 40 feet. The floor is on a level with box car floors. The bins are 6 feet high by 30 feet long; the width varies from 24 feet to 6 feet, according to the quantity of scrap to be stored in them. The bins and supporting structure were made from old car sills at a cost of $700 for material and labor. The classification of scrap and capacity of bins are as follows:

	Tons.		Tons.
1. No. 1 wrought iron	250	16. Iron and steel punchings	70
2. No. 1 cast iron	300	17. Staybolts and limed iron	70
3. Tank sheets	30	18. Brass skimmings	45
4. Light sheets	30	19. Brass ashes	30
5. Boiler steel	45	20. Cast steel	90
6. Elliptic springs	50	21. Sacks, rope and hose	20
7. Coil springs	60	22. Mixed turnings	30
8. Flues	30	23. Cast iron turnings	50
9. Flue clippings	30	24. Wrought axle turnings	30
10. Gas pipe	20	25. Steel turnings	50
11. Journal boxes	60	26. Brass turnings and brass scrap	40
12. Burned castings	60		
13. Malleable castings	50		
14. Channel bars	30		
15. Soft steel	60		

When a carload of scrap accumulates at any point on the road it is shipped unassorted to the scrap bins at the main shop. At the car repair yards the scrap is picked up, unassorted, and placed on a car which is run down the repair track for that purpose. When the car is loaded it is then taken to the scrap bins. The scrap is assorted as it is taken from the car and loaded in barrows and taken to the proper bins. It was found important that the scrap bins should be in charge of a man familiar with car construction, so that good second-hand material would be saved. In this plant an experienced car repairer has charge, as the large number of different castings used in car construction made it necessary to have some one in charge who was familiar with them.

It is truly a matter of astonishment what is found in scrap sent to the bins. New bolts, new washers, new castings, &c., are not infrequently sent to the bins with scrap material. Their presence there is due to the fact that car repairers order more material than is used on repairs of cars and this new material is gathered up with the scrap. It is sent back to the material bins for use. A large quantity of good second-hand material fit to be used again is removed from wrecked and from old cars. All good material of this nature is laid to one side and one man is engaged in wheeling this material to the casting pile or material bins, to be used again. The foreman of the blacksmith shop visits the scrap bins several times a day and advises the man in charge what forgings can be used again. By this double system of inspection all good serviceable material is saved, and the saving amounts to thousands of dollars in a year.

At one end of the scrap bin is a shed, 30 x 42 feet, where the shears, operated by air pressure, for cutting off bolts, rod, &c., are located, and near them the bench of the "brake beam industry." All damaged metal brake beams are carried here and defective parts removed and good parts applied. Two damaged brake beams will often make one good one without the use of new parts, but new parts are also provided and used when the second-hand parts run out of stock. After brake beams are repaired they are taken to the material platform in the car repair yard.

The great industry carried on in this shed, however, is that of making good bolts out of defective ones. If a bolt is not too badly rusted and only has a defective thread it is cut off by the shears, straightened by the bolt straightening machine and then placed in bins (located near the shears) holding about a wheelbarrow load each. When needed they are taken to the bolt cutters and then to the material bins for future use. Old bolts have been utilized in this manner to the extent of 6½ tons per month. The saving in old bolts over the cost of new bolts amounts to $80 per month.

Car coupler knuckles are inspected, and all that are bent and not otherwise defective are collected in lots of 100 and taken to the blacksmith shop and thrown into a furnace. They are then straightened in a former, made in two parts, under a blow of a steam hammer. The cost to straighten knuckles is 5 cents each. If we assume that a knuckle is worth 47 cents as scrap, and after it is straightened it is worth $1.66 as a good second-hand knuckle, deducting the cost of straightening, we have made a gain of $1.61 per knuckle, amounting to $96.60 per month.

Brass skimmings from the brass foundry were formerly sold to the highest bidder, each bidder taking a sample for examination before making a bid. In one instance after receiving a bid for this material it was dried and rattled in a flue rattler until the skimmings were cleaned. It was then sifted and the clean residue was melted and poured into castings. It was found that $125 was saved by cleaning and using the metal instead of selling the brass skimmings.

In my opinion the important points in constructing and operating scrap bins are as follows: 1. Scrap bin floors should be on a level with floors of box cars. 2. The work of assorting scrap should be under the supervision of a man who has had experience in car repairs, that good material may be picked out and set aside for future use. 3. Shears for cutting bolts, bolt straightening machine and a bench with vise should be installed. 4. The foreman of the blacksmith shop should make several visits each day to scrap bins, inspect the contents and have set aside such material as he knows can be used to advantage. 5. Good judgment must be used in regard to the working over of scrap materials or it may cost more in the end than new material.

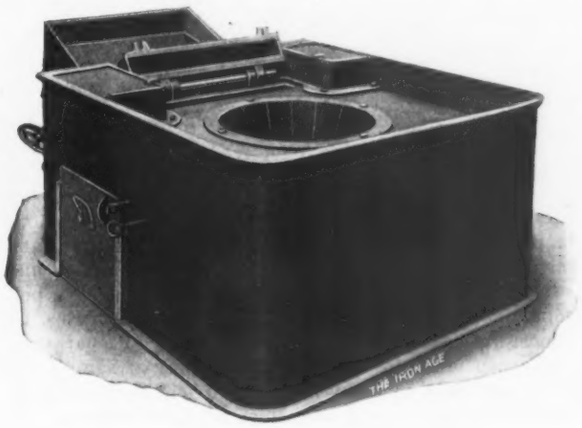
*Abstract of paper prepared for the meeting of the Western Railway Club, Chicago, September 16.

Wheeling Board of Trade.—The Wheeling Board of Trade of Wheeling, W. Va., have recently sent out a letter calling attention to the advantages of the Wheeling district for manufacturing purposes. The fact is referred to that Wheeling offers low priced coal, low priced natural gas, low priced sites, low priced coal property and excellent shipping facilities by rail and river. The fact is also referred to that freights East and West are the same as Pittsburgh. Run of mine coal can be delivered at 90 cents per ton to consumers and natural gas at 6 to 12½ cents per 1000 feet. The Wheeling Board of Trade state that they have recently purchased a large plot of ground on the banks of the Ohio River, which is especially adapted for manufacturing purposes.

The New Buffalo Down Draft Forge

The special advantages of the down draft forge construction introduced by the Buffalo Forge Company of Buffalo, N. Y., are unobstructed light and pure air in the shop. With this class of forge the smoke and gases are removed, as generated, by suction into an adjustable cast iron hood and then carried away by the exhaust current through underground tile piping. The illustration shows the latest production in the way of a railroad forge. It is equipped with a 30-inch down draft hood, which is shown thrown back on its hinges. This is a very desirable feature when the forge is being used for large work. This hood is also adjustable to the fire by means of a worm and gear attachment, while within the hood a damper is placed so that the exhaust may be either partially or wholly shut off when the forge is not in use. Another advantage is found in the size and shape of the fire pit, which has a total depth of 12 inches and admits of a strong, deep fire.

The forge is built entirely of cast iron, and is practically indestructible. They are built right or left hand with an 8-inch exhaust, and with either a 3 or 4 inch blast pipe. In some of the larger shops where extra heavy work is handled they are used in pairs—*i. e.*, placed back to back and the work suspended from a



THE NEW BUFFALO DOWN DRAFT FORGE.

crane above them. The large fire pan, 48 x 48 inches, gives ample room for any work, and its hight of 24 inches above the floor makes it especially convenient. The equipment includes an improved blast gate and anti-clinker dumping tuyere. The latter is a simple device for removing ashes and clinkers from the bottom of the fire without injuring the fire or delaying the work in hand. This is accomplished by a lever attachment to a drop door at the bottom of the fire bowl.

The International Harvester Company of America.—Ways and means have been devised by the International Harvester Company for the marketing of the product of the organization. The first step in the scheme is the incorporation of the International Harvester Company of America under the laws of Wisconsin with a capital stock of $1,000,000. The new company have taken over the charter of the Milwaukee Harvester Company, whose business was absorbed by the International Harvester Company. The selling company will market the product of the parent company in North and South America and the West Indies, having absolute control of the sales, and the entire system of special and general agencies will be placed in the hands of this company. The general control and management of the International Harvester Company of America will be vested in the parent company, the officers and directors being the same for each company. A division of department heads will be necessary, the selling officers being transferred to the new company. It is stated that other selling companies will be organized to market the product of the great company in European and other foreign countries, all the selling companies to bear the parent company's name, with the additional name of the country in which the individual selling companies will be located.

An Electrical Trust in Germany.

Simon W. Hanauer, Deputy Consul General at Frankfurt, sends the following advices:

An attempt was made about 18 months ago to unite the business interests of some of the large electrical companies in Germany. The attempt failed because the stockholders of the different companies could not agree upon the terms of the merger. But the terrible condition in that industrial branch, the passing of dividends, the swallowing up of accumulated reserve funds and the decline in the price of the securities of the electrical stock companies, with other considerations, have produced a change in the views of the stockholders and the directors of electrical companies. Now the cry is for uniting them into one central concern so as to stop hurtful competition and useless expenditures, thus reducing cost of production and realizing a profit.

The Berlin *Aktionair*, a leading financial paper, in its late issue devotes an able editorial to this subject, from which I make the following extracts:

The general meetings of the Lahmeyer and the Schuckert electrical companies, which have lately taken place, have again directed the attention of the money market and of private investors to the position occupied by electrical enterprises, in which an immense amount of capital is engaged. Strong efforts are to be made to improve the condition by means of far reaching consolidation measures. It is attempted to create, after the model of an American trust, a unification of all German electrical companies.

It is well known that as far as the domestic business in this manufacturing branch is concerned slaughter prices are the order of the day, and in outside business the competition of the United States is making itself disagreeably felt.

The electrical industries of the United States are comprised within a few very large concerns, which form a monopoly bound together by price agreements and secure against foreign price cutting on account of the high American tariff rates on importations from foreign countries.

Thanks to the protection afforded by these high tariff rates, the American electrical monopolistic companies can maintain high prices on home contracts and keep their works fully employed by taking foreign orders at very low bids. Thus the American competition has made it well-nigh impossible for German electric motors to be sold outside of their home market. It is quite rational to say that the trusts have been created by necessity. Telling proof of this can be found in the numerous trust formations now manifesting themselves in Germany. Dire necessity is forcing the manufacturing branches under one head. The difficulties under which the German electrical industries labor have been told time and again. It is no exaggeration to say that this particular branch to-day works in a more unbusiness-like way than any other of Germany's industrial branches.

To-day all interested in this industry are convinced of the necessity of a combine. Every company's business report that has appeared of late contains this proposition. One even went as far as to recommend the consolidation of all European electrical companies into one trust.

The present disintegrated condition of our electrical industries must tempt our most dangerous competitors—the Americans—to move upon us. When the Americans have satisfied themselves of the fact that most of our companies are in a sickly state they may feel tempted to break in upon us in hopes of rooting out these sickly concerns. But the position will be quite different when all electrical companies of Germany show a united front. Then the Americans will think twice ere they attack us. Our great banks would do a meritorious action if they were to take the initiative in this centralization move.

Notes from Mexico.

Growth of Manufacturing.

DURANGO, September 15, 1902.—Although Mexico has been a manufacturing nation for years, many of the products of her skilled artisans having won world wide recognition, the trades in which Mexican craftsmen have excelled, such as the making of saddlery and other leather goods, in the art of the silversmith and others, have been carried on upon a limited scale and by manual processes, so that while the work of their genius has been admired by tourists who have accidentally met with it in their travels it has figured little as a factor in international trade. The establishment here of manufacturing enterprises upon lines of modern development, in which steam and machinery supersede the slow methods of manual operation, is an incident in the country's remarkable progress, whose birth date goes back no further than a decade or so. The industries thus established are as yet few in number, but yearly there is a new impetus to effort in some direction, and the modern supplants the ancient. There are now, thanks to the fostering care of the Government, several well established industries in Mexico which have sufficient capacity to produce a surplus of the goods manufactured. This country is no longer a consumer only, but is a producer also, and a competitor for trade in the markets of the world in certain lines. If this be doubted confirmation of the statement is to be found in the fact that under the auspices of the Government a special commercial commission have recently been appointed whose object is to make a tour of Central and South American countries for the purpose of introducing into those markets goods of Mexican manufacture. The commission will be a sort of traveling commercial symposium, and the sample cases of its members will be both numerous and weighty. The products of Mexico's manufacturing plants, with which the commission will try to win the trade of the southern republics, include goods so diversified as silks and soaps, scents and shoes, henequen, hats, whisky and beer. A full line of samples in textiles will be taken, and it is said that in the commission's equipment will also be found "steel rails from Monterey." It is to be feared that this latter statement is made in a Pickwickian sense, for although there is doubtless in the territory indicated a splendid field for friendly rivalry in the matter of supplying the demand for railway material, the Monterey plant has not yet started up its rail mill. The commission may perhaps wait and take along some of the product of the first "turn."

Imports and Exports.

In the fiscal year, 1901-1902, Mexico's imports reached a total (gold) value of $64,656,349.43, and the exports a (silver) total value of $156,168,145.66. The imports show a small decrease and the exports a very appreciable increase, as compared with the preceding fiscal year. The distribution of the exports was as follows:

	Silver values.
European countries	$23,957,099.32
Asia	500.00
South America	60,484.89
Central America	851,865.16
West Indies	4,688,942.00
North America	126,609,254.29
	$156,168,145.66

Among the imports appear "machinery and apparatus" of the value of $8,194,321.47, "vehicles," $1,368,535.34, and "arms and ammunition," $1,387,106.77.

Order for Gunboats.

The two cruisers and transports for the Mexican Government being built at the Elizabethport, N. J., ship yards are nearing completion. A similar order has just been placed by the Government with an Italian firm. These vessels are to be of 1188 tons displacement and of a minimum speed of 16 knots. Their armament will consist of eight rapid fire guns of different bore.

Industrial Notes.

According to a City of Mexico daily paper, which is somewhat indefinite in its news concerning industrial enterprises, "Cooking stoves made from native material at the Monterey foundry, under the direction of foreign mechanics, are being largely introduced in all the great cities of the republic." There is more than one foundry in the enterprising city named. None of these stoves of native make has yet been encountered in Durango.

Frank W. Highberger has succeeded W. B. Weston as representative in Mexico of the United States Steel Corporation, with headquarters in the City of Mexico.

A glass manufacturing plant, which has been in course of construction for some time in Monterey, is nearly completed. Workmen will probably be brought from Europe to operate it. J. J. D.

An American Exposition Afloat.

The Commercial Oriental Expedition Company, Incorporated, of Seattle, Wash., are making an effort to interest American manufacturers in a unique floating exhibition of American goods to be sent to the Orient, Africa and Australia. In a circular letter the opportunity is offered American manufacturers of sending representatives with exhibits on a six months' cruise and the advantages to be attained therefrom are dwelt upon. The steamship "Oregon" is scheduled to leave Seattle on November 15, 1902. A special feature of the enterprise is the bringing of the native merchants at the distributing ports and from long distances in the interior of foreign countries to the vessel.

The expedition is undertaken in conformity with the ideas expressed by United States consuls on the necessity of exhibiting samples to successfully transact business in Oriental countries, sales from catalogues being almost impossible. The necessity of acquaintance with the different modes of packing goods for the various markets has been recognized by all manufacturers and merchants seeking trade with foreign countries, and such knowledge can only be fully ascertained by a personal representative visiting the different countries, an opportunity which this expedition affords. Preparations have been made for the extensive display of samples on the lower deck of the vessel, which will be electrically lighted and fitted with conveniences for exhibition purposes; space will be allotted to exhibitors pro rata. Power will be furnished exhibitors when and where necessary. The vessel will be equiped with launches for carrying passengers between the ship and the shore at such places where wharf facilities are inadequate. Reservations will be received up to October 10.

The officers of the Commercial Oriental Expedition Company are Sol. G. Simpson, president; Surtees Hope, vice-president; Richard Chilcott, secretary; treasurer, First National Bank, Seattle. The First National Bank and the National Bank of Commerce, both of Seattle, are given as references.

T. G. Thompson, with headquarters at Chicago, has been appointed general agent for the States of Indiana, Iowa, Michigan, Minnesota and Wisconsin, and he is making a special effort to interest manufacturers engaged in the iron and steel industry. Mr. Glenn, secretary of the Illinois Manufacturers' Association, speaks well of the enterprise and believes that if properly managed it will be of great benefit to American manufacturers.

Foundry Supplies.—From their Detroit office the S. Obermayer Company have just issued the first number of a bright leaflet called "The Obermayer Bulletin of Foundry Information." It is intended to issue the "Bulletin" periodically, and devote it to subjects of general interest to foundrymen. The first issue is chiefly devoted to an examination of the molder by the editor regarding the chemical properties of pig iron. Of course the molder shows how little he knows about the subject, and the "chemist" conveniently steps in and answers the questions of the editor in dignified style. The answers are, however, put very plainly for a chemist, and there is no reason why the molder should not in time know as much about pig iron as his learned brother.

Lake Mining News.

Railroad Developments on the Mesaba.

DULUTH, MINN., September 20, 1902.—In order to handle its rapidly increasing ore traffic from the western Mesaba range to its docks at Allouez Bay, Lake Superior, the Great Northern road will double track its lines from the docks to the point where the tracks turn north paralleling the Duluth, Missabe & Northern. Part of this is already two tracks, but 17 miles remain single. In addition considerable steel will be laid in sidings and in new spurs to mines. So far this year the road has built 14 mine spurs, most of which are handling ore to some extent. Others, notably that to the Hawkins mine, are not completed, but are expected to add a large annual tonnage. If the explorations under way by the Cleveland Cliffs Iron Company and others in the western Mesaba are successful, and in some a large tonnage is assured, a still further material increase in tonnage is promised. By November 15, this year, the Great Northern will have hauled to docks 4,000,000 gross tons, which will be nearly double the road's ore business of 1901. In 1900 the road shipped 1,500,000 tons and in 1899 800,000. Its increase has been due to the policy of controlling ore deposits that has been pursued steadily by Mr. Hill for some time, and with great vigor and skill since the organization of the United States Steel Corporation. He now controls an immense acreage of valuable lands on the range, and is fast adding to his holdings. He is a sharp competitor for mining interests, for he is able to pay more than most mine buyers on account of the profit in the haul of ore and from the fact that the Great Northern can control such sums of cash at low interest rates. This profit in the haul, added to what there may be in mining or royalties, gives a decided advantage, and in many cases this has been utilized to take properties that mining concerns have been after. It is probable that in addition to a double track the Great Northern will still further increase ore dock capacity, and will add to rolling stock for this trade.

United States Steel Corporation's Interests.

The Minnesota Iron Company have ordered of the Marion Steam Shovel Company of Marion, Ohio, eight of their large Model 90 shovels for mining work, the machines weighing nearly 90 tons each. These shovels will be delivered in the spring and distributed on the Mesaba and Vermillion ranges. Some will take the place of old or smaller shovels at stripping and stockpile loading. The United States Steel mining companies had about 50 steam shovels before their consolidation, the Oliver Iron Mining Company alone having 20 machines.

An immense amount of work is being done in mines of the United States Steel Corporation in the way of deep shafts, to care for a large product and planned for permanence. There is "B" at Pioneer, "A" at Norrie, and the tremendous shaft at Chapin, which is to be 10 feet 4 inches by 23 feet 1 inch, inside timbers, and is to be very deep. All of these are steel lined and timbered. They also have the deep shafts at Sibley and Savoy, Vermillion range, the big shaft at Aragon and another new shaft at Norrie, the 800-foot shaft at Hartford, besides many others of lesser importance. "B" at Pioneer is now down about 900 feet, and will rest shortly. It is in green stone, and the ore body will be reached by drifting. "A," at Norrie, is 700 feet deep, but it will eventually go as far as the ore makes downward, perhaps more than 2000 feet. It dips 58 degrees and runs in the foot the entire length. New No. 7 shaft, at Norrie, is 600 feet deep; it is a smaller shaft, and will free a large tonnage of ore now required to hold old No. 7. Savoy shaft is now 750 feet deep. It will be ready for use in about 60 days, but will be extended as eventually desired to at least 1300 feet. It is in the green stone and dips at an angle of 82 degrees. Sibley shaft is 620 feet deep. A large shaft will be sunk at Zenith, lying between Pioneer and Sibley. Besides these and other new shafts the corporation's mines are being equipped quite rapidly with steel head frames, diminishing the danger from fire. They are now erecting one at Savoy 165 feet high, are starting at Sibley a duplicate, are erecting one at Aurora No. 5 shaft, and will put in several more during the coming year.

Other Ranges.

An important discovery of ore has been made at the old Colby mine, Gogebic range, which had been for years thought to be an exhausted property. The operators decided to test under the cross dyke and have found the ores to make there in quantity similarly to other properties of the same range. There is much similarity in character of Colby and Ironwood deposits. Colby was the most important early mine of the Gogebic, and was a steam shovel proposition back in 1886, and later Jos. Sellwood was prominent in its history and made a phenomenal output for some time. After three years of steam shovel mining underground work had to be commenced, and later, with the separation of the Tilden tract, the old mine was regarded as practically valueless.

Pewabic mine, at Iron Mountain, will ship this year about 550,000 tons, larger than its best preceding record, which was 530,000 tons in 1899. Most of its ore at present is of a leaner grade than its earlier fancy ores. The mine has been opened for a number of years. The company's Walpole mine is down to 600 feet, and is securing a 60 per cent. Bessemer ore in some quantity. The old Quinnesec deposit of high grade ore seems to have been found once more, a tunnel having cut a lense 14 feet thick, averaging 64 per cent. iron and 0.014 per cent. phosphorus. It is expected that the lense will make into a lower level. The mine is 550 feet deep, and another 100 feet will be added at once. Florence mine will be equipped with a pneumatic system of underground haulage, and an extensive change will be made, both underground and on surface in methods. Duluth men have taken the old Nanaimo mine at Iron River, and will pump it out and resume explorations. The lands of the Breitung Estate, both in Dickinson and Iron counties, will be thoroughly explored. Several drills are now working on the estate's lands on the Marquette range.

Miscellaneous Notes.

Silver mines in the Thunder Bay district, north shore of Lake Superior, that have been worked in a small way for four years, since their idleness of half a score of years, have now been grouped into the consolidated silver mines of Lake Superior, and will be extensively opened the coming winter. In the past few years of work about $400,000 worth of rich ore has been removed at a fair profit, with the antiquated and insufficient means at the disposal of the operators. They have just made a final shipment of 30 tons of this ore to smelters, and will put in the winter in rebuilding their main shaft, erecting engines, compressors, hoists, &c., adding to the stamping capacity and in blocking out ore. The cost of operating in the district is now but a small part of what it was in the old times, on account of railway communication and better markets, and although silver could not then be sold at a profit at $1 an ounce, it is claimed by the operators that they can do well at present low prices. The formation seems to be fairly continuous, but ore concentrations are apt to be pockety.

An asbestos discovery that seems to be of importance has been made near Ishpeming, and is being worked. Trial lots will be shipped out at once. If these are what they seem to be a large force will be set at work following the deposits.

Adventure copper mine, west of the Houghton district, is starting a new and modern mill of three large stamps, and much is expected from it. The first stamp was set at work this week, and the others will follow shortly. The mine is in good shape, with a large amount of stopping ground blocked out and 4 miles of penings.

There is very little copper on hand at the lake, shipments from smelters being up to production. At this time a year ago there were 6000 tons stored here, mostly in the Bigelow-Lewisohn properties. D. E. W.

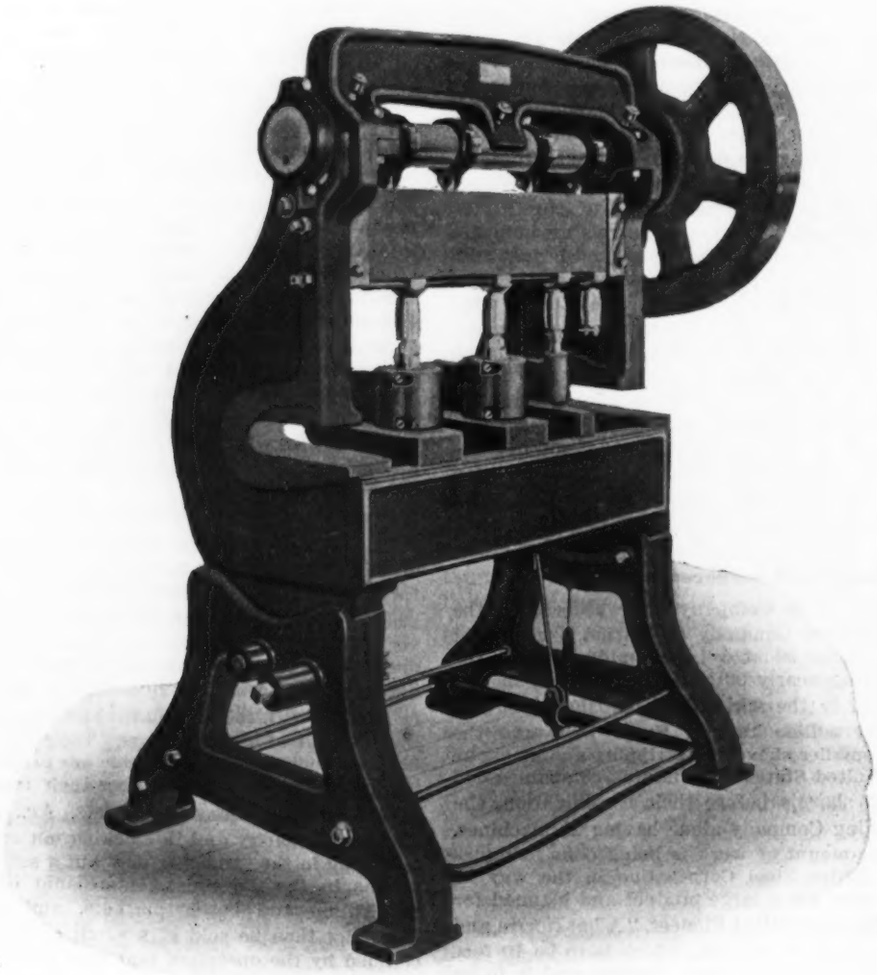
William Flintoff, Boston, Mass., dealer in second-hand machinery, has removed to 382 Atlantic avenue, where he is carrying a stock of engines, boilers, pumps, heaters, lathes, screw machines, &c. A stock of engineer and mill supplies is also kept on hand.

The Tatum Sheet Metal Press.

The sheet metal press recently designed by the Samuel C. Tatum Company of Cincinnati is doubly adjustable; first, the punching members can work at varying points in the bed, and, second, vertical adjustment so that at least three strokes of the slide can be provided for each press, if desired. The unit of the press is the punching member D, Figs. 2 and 3, which may be of any size, according to the punch and die to be operated. In these members the punches *b* and dies *a* are securely mounted in a single casting in such a way that their alignment is assured under all conditions. This obviates the tedious adjustment necessary when the punch and die are separately mounted, permits the employment of unskilled labor and avoids possibility of injury to the die. These members, complete and ready for work, are set over a slot, C, in the bed at any point in its width, which is 30 inches in the style M press, illustrated in Fig. 1. They are adjusted at will in relation to each other and the work to be done, and then fixed in place by grinding lugs, *f*, Fig. 4, and fastened by a bolt passing through the bed and tightened from below. The metal to be punched is fed into the slot of the throat *d* to a depth determined by a simple tempered steel gauge, *e*, which is then firmly fixed by the screw shown.

The number of members operated at one time depends entirely on the work to be done and is limited only by the distance between the standards b^1, b^2. As many as 15 of the standard round holes, Fig. 6, No. 1, can be operated at once; yet the press will work equally as well with one or with a combination of several large and small members. When the members are set the punches *b* are connected with the working parts of the machine by means of special cotters which pass through holes in the upper ends of these punches, *c*, and join them with sleeve nuts, K, which at J slide horizontally to any point in the width of the machine in grooves milled into the bottom of the connecting slide I. These sleeve nuts vary in number with the punches to be operated. They consist of a sleeve incasing right and left hand screws with check nuts at the top and bottom. By means of the adjustment thus provided it is a simple matter to regulate the depth to which the punch shall enter the die, and to offset the punches so that when operating several members the punches shall enter the metal at different times, thus distributing the strain of the stroke at will.

The connecting slide from which the sleeve nuts depend is a solid body extending throughout the width of the press and working in adjustable V blocks, H, H^1, attached to the frame of the press, as shown in Fig. 2.



THE TATUM SHEET METAL PRESS.

Action is imparted to the connecting slide through loose straps or collars, L, pivotally attached to the slide at M, which encircle an eccentric shaft, E, driven by a heavy 30-foot bronze bushed fly wheel, F, and controlled by a simple clutch consisting of two pieces of tool steel, one of which when the treadle is pressed is thrown into the hub of the fly wheel and strikes any one of the four clutch locking points, which are projecting pieces of steel imbedded in the hub of the wheel. Action is therefore very quick and positive. There is a brake, G, of usual pattern, and, in addition, a positive safety clutch lock is provided.

The manufacturers have made an especial effort to secure simplicity in construction, and to this end have made the main frame of the press from a single heavy casting, insuring rigidity under action. The weight of the complete press, as shown, is about 2500 pounds, and

all bearings are cast iron and carefully scraped to a full bearing. The accompanying cuts illustrate only the simplest form of press wherein the shaft consists of one piece of steel turned to a single eccentric. In other styles the adjustable strokes of the slide mentioned above are secured by turning from the solid shaft a series of eccentrics fitted with individual straps, thus giving any three strokes of slide which may be required up to a limit of 1½ inches in this pattern of machine. For work requiring clearance above the dies the press can be inclined at an angle of 30 degrees; otherwise, clearance is provided through the base of the punching members and the slot in the bed.

It is notable that in the punching of round holes the standard punching members, Fig. 6, No. 1, will accommodate punches and dies of any size from ⅛ to ½ inch diameter, varying by sixty-fourths, and that all of the punches and dies within this range are interchangeable at will, in that any holder can be used for any punch and die by simply removing the punch and die of one size and dropping in a punch and die of another size without removing the holder from the machine. The substitution of dies and the insertion, removal or adjustment of holders at any desired position on the bed of the press or in relation to each other is such a simple matter that a boy can do it, and the press can thus be operated from first to last with unskilled labor.

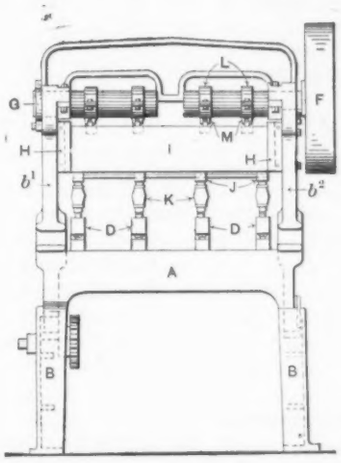


Fig. 2.

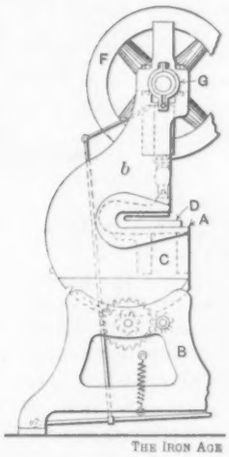


Fig. 3.

Side and End Elevations.

It will be seen that the press is equally well adapted for punching work requiring holes at various distances, for quantity work in blanking parts, justifying the operation of several similar punches and dies, or for finishing with one handling work which requires the several operations of blanking, forming and drawing; for in the latter case members containing dies to do these several operations may be placed side by side and the pieces carried from one to another of these while still connected to the sheet from which they are punched and this connection severed only at the final operation. Thus with each operation a piece may be blanked, another formed and another drawn, severed and finished, securing an obvious economy in operation. Especially valuable to the smaller operator is the fact that for any work in hand members may be had from the makers containing the requisite punches and dies, so adjusted that it is only necessary for unskilled labor to place them securely in the machine, make the connections and feed the metal.

A Cast Steel Furnace Bell.—The Pittsburgh Steel Foundry, with offices in the Bank of Commerce Building, Pittsburgh, and steel foundry at Glassport, Pa., recently turned out a very large and difficult casting. The casting was a bell for one of the Duquesne furnaces of the Carnegie Steel Company, at Duquesne, Pa. This casting was an exceptionally intricate one to make, requiring special care and treatment. Owing to the great shrinkage in the metal, which was of open hearth steel, there was danger of cracking in cooling, but the casting was successfully made without any trouble whatever. As a rule, bells for blast furnaces are made of cast iron, in which the shrinkage is less than half that in steel, but the Pittsburgh Steel Company, who have exceptional facilities for making large steel castings, have turned out a number of bells for blast furnaces made of open hearth steel and very successfully in every case. The weight of the casting complete was 12,500 pounds.

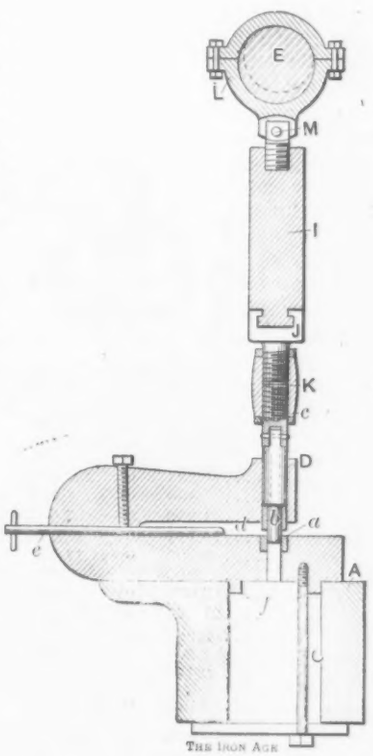


Fig. 4.—Section through Punch and Die.

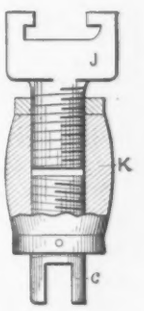


Fig. 5.—Stroke Adjustment.

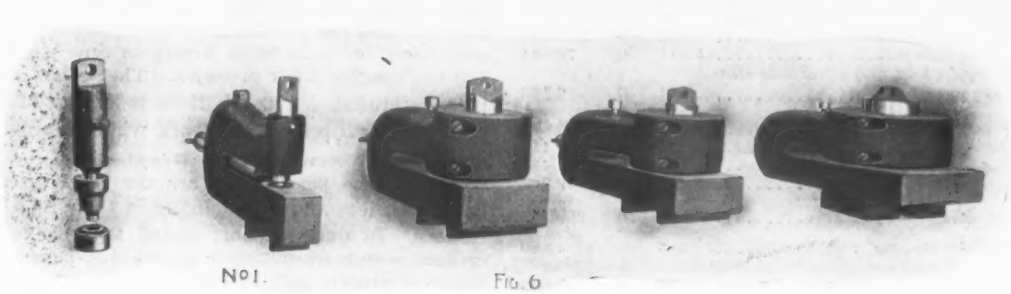


Fig. 6.—Group of Punches and Dies.

THE TATUM SHEET METAL PRESS.

Notes from Great Britain.

American Purchases from Great Britain.

LONDON, September 13, 1902.—Before giving the detailed statement of metals exported from this country to America during the month of August it may be as well to state the extent of the trade during the first eight months of the year. We exported pig iron from January to August to the extent of 612,930 tons, valued at £1,656,089. Of this total no less than 211,317 tons, valued at £784,778, went to America. As during the first eight months of 1901 the tonnage only amounted to 27,957 tons, some idea will be at once obtained of the extent of recent American activity in this market. There has been a decline in the tonnage sent to America of over 1000 tons of bars, angles, bolts and rods, but rails have gone up with a bound from 42 tons in 1901 to 9743 tons during the first eight months of this year. British exports to America of cast and wrought iron during the same period have continued normal. Unwrought steel, however, has jumped from 7797 tons to 32,068 tons, out of a total of 190,608 tons exported to other countries from January to August. With these preliminary remarks indicating the drift of the trade over the longer period, I now subjoin full particulars of exports during the month of August:

	Tons.	Cwt.	Value.
Brass and manufactures of	21	18	£1,211
Copper: ingots, cakes or slabs, and precipitate	195	0	10,342
Old iron and steel	1,381	0	5,096
Pig iron: Liverpool	13,321	0	£65,093
Newcastle	450	0	1,153
Hull	1,910	0	7,055
Glasgow	14,746	0	48,034
Barrow	3,700	0	11,470
Cardigan	500	0	1,500
Hartlepool	2,000	0	7,018
Middlesbrough	27,925	0	71,156
South Shields	2,980	0	8,828
Swansea	300	0	2,700
Leith	2,140	0	6,152
Total pig iron	69,972	0	£230,159
Bar, angle, bolt and rod	369	0	£3,958
Rails of all sorts	5	0	42
Wire and manufactures (except telegraphic)	238	0	5,209
Hoops	234	0	1,651
Sheets and boiler plates, Glasgow	12	0	109
Iron and steel galvanized sheets, Liverpool	50	0	612
Tin plates and sheets	5,011	0	70,644
Cast and wrought iron and other manufactures, unenumerated	84	0	2,186
Steel, unwrought: Liverpool	1,631	0	£29,654
Newcastle	21	0	117
Hull	178	0	1,434
Glasgow	3,460	0	19,207
Total steel, unwrought	5,290	0	£50,412
Black plates for tinning, Swansea	5	0	£60
Manufactures of steel, or of steel and iron combined	13	0	5,643
Lead and manufactures of	15	0	180
Tin, unwrought	20	0	2,413

Prices during the week have been distinctly wobbly, but on the whole the market has remained firm. German and Belgian steel are still cutting into English makes with disastrous results to the British makers, if not to all concerned. It is recognized on all hands that the firmness of the market, with a slight tendency to stiffen particularly in regard to finished iron and steel, is entirely due to the American demand. The moment that slacks off, unless some important event intervenes, the market will substantially weaken. In the early months of the year Northamptonshire pigs were selling at 47 shillings 6 pence; they are now at 53 shillings. This may be put down almost entirely to the Americans skimming the market of Northern products, and so removing what would otherwise have been competitive tonnage. For the rest, the manufacturers of finished articles are gradually coming into keen antagonism with the proprietors of raw material. The price of fuel continues proportionately much too high for easy commercial exchange, and consumers of common bars are buying very sparsely. The association standard price is £6 12s. 6d. to £6 15s., but they are only offering £6 10s. There is reason to believe that business has been generally below the standard price. Current standard prices are as under:

Pig Iron.—Scotch, 58 shillings 1 penny; Cleveland, 53 shillings 9 pence; hematite, 61 shillings 6 pence. Forge qualities, Staffordshire cinder, 50 to 51 shillings; part mine, 53 to 55 shillings; all mine, 57 shillings 6 pence to 67 shillings 6 pence; best ditto, 77 shillings 6 pence to 80 shillings; cold blast, 95 to 100 shillings; Northamptonshire, 53 shillings 6 pence to 54 shillings; Derbyshire, 54 to 55 shillings; North Staffordshire, 54 to 55 shillings; Lincolnshire, 56 shillings 1 penny.

Finished Iron.—Marked bars, £8 10s.; Earl of Dudley's brand, £9 2s. 6d.; second grade, £7 10s.; common unmarked bars, £6 12s. 6d. to £6 15s.; sheets, singles, £7 12s. 6d. to £7 17s. 6d.; doubles, £7 15s. to £8; trebles, £8 7s. 6d. to £8 12s. 6d.; galvanized corrugated sheets, f.o.b. Liverpool, £11 5s. to £11 10s.; hoop iron, £7 5s. to £7 10s.; nail rod and rivet iron, £7 5s. to £7 10s.; gas strip, £7.

Steel.—Bessemer billets, £4 15s. to £5; best Siemens billets, £5 to £5 5s.; mild steel bars, £6 10s. to £7; steel plates, £6 10s. to £7 10s.; steel girders, £6 to £6 5s.; steel angles, £5 15s. to £6 5s.

On Thursday last the stocks were as follows: Connal's Glasgow, 41,740 tons; Connal's Cleveland, 127,955 tons; hematite, Middlesbrough, 300 tons; West Cumberland, 6379 tons, and the Furness Railway, at Barrow, 21,875 tons.

American Orders Slackening.

It is agreed on all hands that American orders are slackening off. A few weeks ago I suggested that it might not be long before American purchasers would pay to be rid of their bargains. I have heard of one case this week and I believe there are others. About the only thing in demand now is pig iron. A contract has just been placed for 10,000 tons of Middlesbrough hematite, mixed numbers, for consumption in Pittsburgh.

Reconstructions.

I referred last week to the balance sheet of Bolckow, Vaughan & Co., and pointed out how that they are maintaining their works at a high state of efficiency. Their latest move in this direction has been to give to Babcock & Wilcox orders for 18 boilers, to be fired with blast furnace waste gases. The Consett Iron Company, Limited, and the Frodingham Iron Company have given out orders for some large American type ¼-crank blowing engines for high pressure. The orders have been placed through Frank C. Roberts & Co. of Philadelphia, who will inspect the work while in progress.

New Railway Regulations.

During the past few years the railway companies have been less and less obliging in their relations with traders. In quite a short period there have been increased warehouse charges, siding rent charges, demurrage on private and railway wagons, enforcement of the owner's risk conditions in connection with the conveyance of castings and other metal goods, and a number of other irritating regulations. Things have now come to such a pass in the Midlands that the Midland ironmasters have met together officially and have instructed a solicitor to take action to protect their interests.

Ferromanganese.

It is not easy to secure reliable quotations in this country for ferromanganese on account of private arrangements made between members of the small ring controlling this line. I have, however, just seen a quotation which fills the bill. The present price of 80 per cent. for home consumption is £9 10s. per ton, delivered buyer's works, less 2½ per cent., with a scale of 1 shilling 6 pence per unit up or down. The export price is £9 per ton, f.o.b. Middlesbrough, Liverpool or South Wales ports, less 2 per cent.

The Copper Market.

Since last week the price of copper has gone up £2 and is quoted to-day at £53 10s. Manufacturers in this country are advised to buy at this price, as there is a

general impression that it will advance. At the same time complaints are rife; one hears on all sides that it is high time to stop fooling over the market fluctuations. The uncertainty of prices is having a depressing influence not only upon the lighter trades in Birmingham and Wolverhampton, but engineers generally are calling for more precise information and greater regularity of price. It is significant that, no matter how official a statement may be as to the amount of copper in sight, it is met with polite incredulity. The feeling is that the English engineering and electrical trades are dancing to the American tune and naturally they don't like it. It is certainly a little strange that copper should remain about the one speculative element. When prices vary between £50 and £70 a ton even the most steady going customer is nonplussed. The fortnightly reports of Henry R. Merton & Co. are, of course, so far as they go, universally respected, but the feeling is that the ultimate regulation of copper must come from New York. It does not meet the criticism to say that copper prices are regulated by demand and supply. That is precisely what they are not. Is it not time, from the point of view of the best interests of American exporters themselves, for some convention to be arranged whereby greater stability can be secured in the copper market? It is not a question of price so much as of permanence. As a matter of fact, very few complaints were made when copper stood at £70 a ton. I believe most engineers and consumers of copper would gladly pay a price centering round, say, £57 10s. It is the uncertainty that is so upsetting and irritating.

A Useful Tender.

What strikes me as a valuable tender has just been announced. I quote it, not because of its intrisic value, but because of its wide variety, which therefore leaves the door open for some pushing merchant of railway material, possibly on the Pacific Coast. If this tender were secured, it looks as if it opens the door for greatly increased trade in the future. It comes from the office of the Supply and Tender Board, Adelaide, who announce that tenders will be received up till 3 o'clock p.m. on October 29 for the supply of the following materials, delivered in bond on wharf, Port Adelaide, wharfage to be paid by the contractor:

36 mild steel boiler plates.
8 best mild steel smoke box tube plates for flanging (two drawings, 25 cents each).
12 copper tube plates for flanging (three drawings, 25 cents each).
409 bars of channel steel (six drawings, 25 cents each).
361 bars of angle steel (six drawings, 25 cents each).
40 bars square root angle steel (one drawing, 25 cents).
143 mild steel plates or bars.
124 mild steel strips.
91 mild steel bars.
541 engine and tender tires (ten drawings, 25 cents each).
Westinghouse Brake Company's standard quick acting brake details.
Details of Pintsch's patent system for lighting railway carriages.
48 metal water closet pans (one drawing, 36 cents).
48 Egyptian metal folding lavatories (one drawing, 50 cents).
160 compound india rubber washers (one drawing, 36 cents).
48 white porcelain angular urinals (one drawing, 36 cents).
6 steel saw disks (one drawing, 50 cents).
200 brass tower bolts (one drawing, 25 cents).
6 spiral springs (one drawing, 36 cents).
224 spiral bearing springs (two drawings, 25 cents each, and one, 25 cents).
270 smooth surface cold rolled panel plates.
2 locomotive engine frame slabs.
26 emery wheels.
108 spiral springs for Hyde's patent window lifts (two drawings, 25 cents each).
300 private locks for railway carriage doors (one drawing, 25 cents).
8,000 springs for railway carriage lights and louvers (one drawings, 25 cents).
140 Matthews' patent improved carriage door locks (one drawing, 25 cents).
150 bars of angle brass (one drawing, 25 cents).
26 carriage rugs.

Specifications may be seen and forms of tender obtained at the above office or of the Chief Mechanical Engineer, Islington, South Australia. Date of delivery as well as the names of the materials tendered for must be distinctly stated in each tender. The materials are to be subject to the inspection, test and approval of the Government Inspecting Engineer in London, or the Chief Mechanical Engineer in Adelaide. S. G. H.

The Chicago Pneumatic Company.

J. W. Duntley, president of the Chicago Pneumatic Tool Company, who has just returned to Chicago from a five weeks' trip to Europe, gives some interesting information concerning the manufacture and distribution of pneumatic tools in Europe and in the United States. While abroad Mr. Duntley perfected the organization of the Consolidated Pneumatic Tool Company by merging the two English plants—the New Taite-Howard Pneumatic Tool Company and the International Pneumatic Tool Company—with a capital of £300,000. W. A. Macnochie, M.P., is chairman of the board of the Consolidated Company, whose organization operates factories at 138-148 Tooley street, London, and in Chippenham, Wiltshire, England, producing pneumatic tools for European distribution. The Chicago Pneumatic Tool Company own all the stock of the English companies.

Arrangements are also being made by the Chicago Pneumatic Tool Company to erect a plant in Scotland, which will be a duplicate of the Detroit plant, for the manufacture of tools used in the shipbuilding work of Scotland. The exhibition before the Ship Builders' Federation, Glasgow, recently held, was highly successful and pneumatic tools have been adopted for nearly all the shipbuilding work in the Scotch yards. The American workmen who have been engaged in exhibiting the pneumatic tools used in shipbuilding in Scotland are now in Germany, and subsequently will go to France for a like purpose.

The Chicago Pneumatic Tool Company now own and operate four factories in the United States and have two factories under contract manufacturing pneumatic tools. The Detroit plant, manufacturing tools, and the Franklin factory, manufacturing air compressors, are being run day and night, the increased demand for the products making such increased work necessary.

As illustrating the rapid growth of the pneumatic tool business Mr. Duntley called attention to the fact that the sales of the Chicago company in 1895 amounted to $8000, while sales during the current year will aggregate about $3,000,000. While abroad Mr. Duntley secured an order for 130 pneumatic riveters from one of the largest shipyards in France.

Tie Plates.—A committee of the Roadmasters and Maintenance of Way Association, of which J. E. McNeil was chairman, has made the following report: "Tie plates, not less than ¼-inch thick, should be used on every soft wood tie in main tracks. They should be punched to perfectly fit the rails when the spikes are driven straight, and the best results are obtained when the tie plates are imbedded in the ties before they are put in the track. This is sometimes done by a tie plate press in which two plates are set with one blow, the power used being steam. The cost per plate is from one-half to three-fourths of a cent and from 3000 to 4000 ties can be plated in ten hours. Another tie plating machine is operated by hand and the power is derived from an eccentric. Ten to 12 men can full plate about 1000 ties in a day. This machine is simple and quite satisfactory. Both machines are, as a rule, only operated in material yards. We know of no satisfactory device for imbedding plates without removing the ties from the track."

French steel rail makers secure pretty stiff prices for home work. At a recent letting of 31,875 metric tons, to be delivered in three years at Thouars, bids ranged from 169.85 francs per metric ton to 173.15 francs. At 19.3 cents per franc we figure that 170 francs per metric ton is equivalent to $38.34 per gross ton.

In 1901 the French railroads consumed 5,637,700 metric tons of coal at an average price of 21.14 francs per ton.

Electric Welding of Rail Joints.

A Description of the Machines Used and Method of Operation.

The process of electrically welding rail joints, as applied by the track welding department of the Lorain Steel Company, Lorain, Ohio, comprises three distinct operations. The machinery is mounted on trolley cars of suitable design, the running gear of which is provided with threaded axles so that the machines can be used to weld track of different gauges. New rail is welded either before or after the paving is in place, space being left at the joints to permit the entrance of the welder. In old rail the paving is removed around the joint and the old plates and bond wires are removed. The rail ends are then brought up to the proper grade.

In the welding process the first operation is that of sand blasting, Fig. 1, by means of which all dirt, rust and foreign matter is removed from the rails at the points where the welds are to be made and from the bars used in making the joint. The apparatus for this work consists of a 10 horse-power motor driving an air compressor, a tank for the storage of air and a bin for holding a supply of sand. A sand mixer of the Tilghman type is also provided. By means of a hose and nozzle the operator directs the blast of air carrying the sand against the rail until all foreign matter has been removed. The bars are similarly treated and the joint is ready for the actual operation of welding.

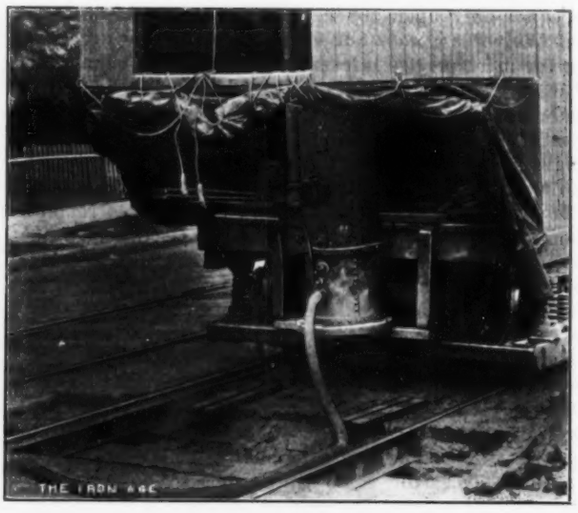


Fig. 1.—Sand Blast.

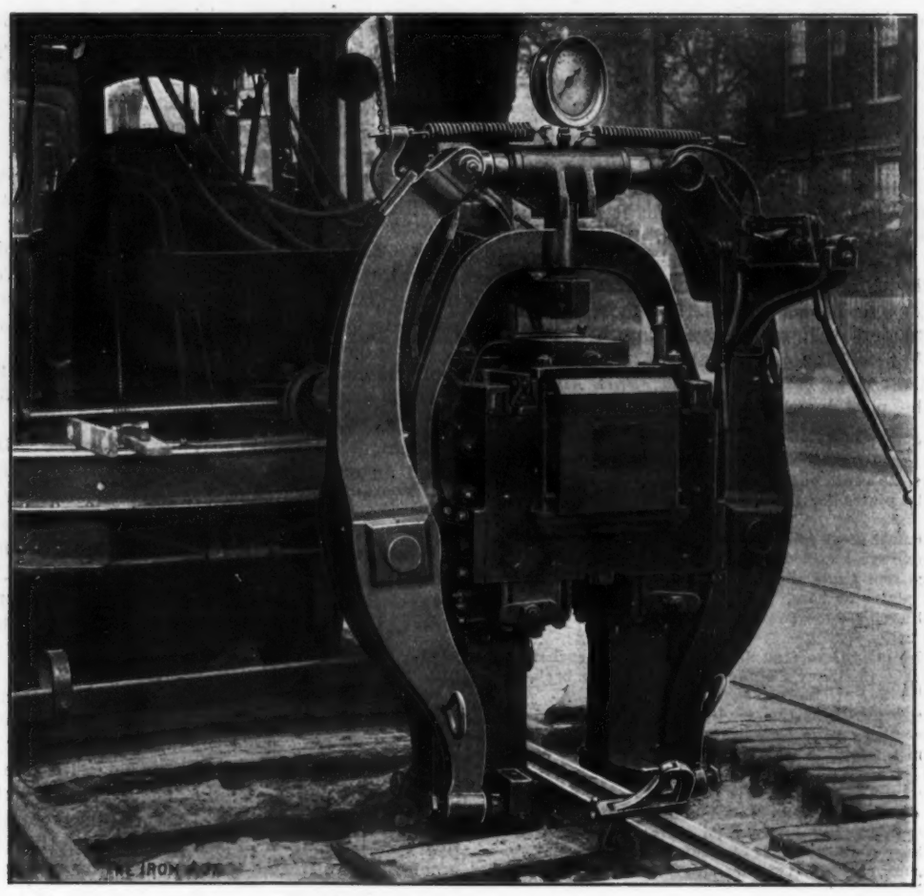


Fig. 2.—Front View of Welder.

ELECTRIC WELDING OF RAIL JOINTS.

The apparatus for welding is carried in two cars coupled together by a special form of slip coupling, which permits of sufficient range of movement for the car carrying the welder proper to be moved from one weld to another of the three welds necessary in making a joint without the necessity of moving the second car. The welder itself is hung from a bail on a crane extending out beyond the end of the car. This crane permits of lowering and raising so that the jaws of the welder can engage the sides of the rail and also to shift the welder from one side to the other to engage both rails of the track. The crane, Fig. 2, is operated by friction clutches from a shaft in the car, which is kept running continuously by a 5 horse-power motor. This motor also drives a small rotary pump for circulating water through the welding transformer and the faces of the contacts to keep them cool. After the water has passed through the welder it goes to a cooling tank on top of the car. This cooling tank has a serpentine partition starting from the middle and passing around and around until the outer circumference of the tank is reached. A false bottom is provided, and air, from a blower in the

car, is forced under the false bottom and made to blow up through numerous holes. The hot water from the welder passes into the outer portion of the serpentine and gradually finds its way to the center, from where it is conducted to one of the tanks in the car. In its passage along the serpentine path the air is forced up through the water and forms a most efficient method of cooling, depending somewhat on the humidity of the atmosphere, being most efficient when the atmosphere is driest.

The welder itself is an alternating current transformer, the primary winding of which consists of two coils in parallel of 44 turns each. The secondary coil is a single loop of copper of large cross section, the terminals of which form the contacts, or jaws, which engage each side of the rail and between which the weld is made. The secondary winding is so made as to entirely inclose the primary coils, which are insulated in oil. On each side of this transformer and supporting it, but insulated from it, are the two large levers, hinged together at about two-thirds the distance from the top, for transmitting the necessary pressure to the weld. These levers are connected at the top by an hydraulic jack. A hand pump for forcing water into the jack is bolted to one of the levers. A pressure of 4100 pounds per square inch is obtained on the 3⅞-inch diameter rams of the jack, the leverage on the arms increasing this so that about 37 tons pressure is developed at the weld.

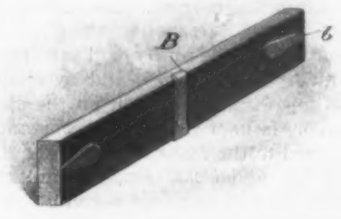


Fig. 3.—Bar for Welding.

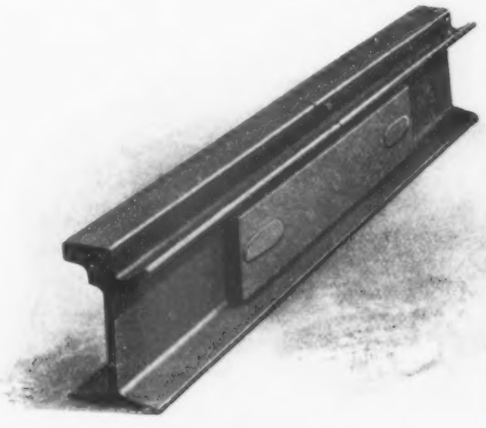


Fig. 4.—Completed Joint.

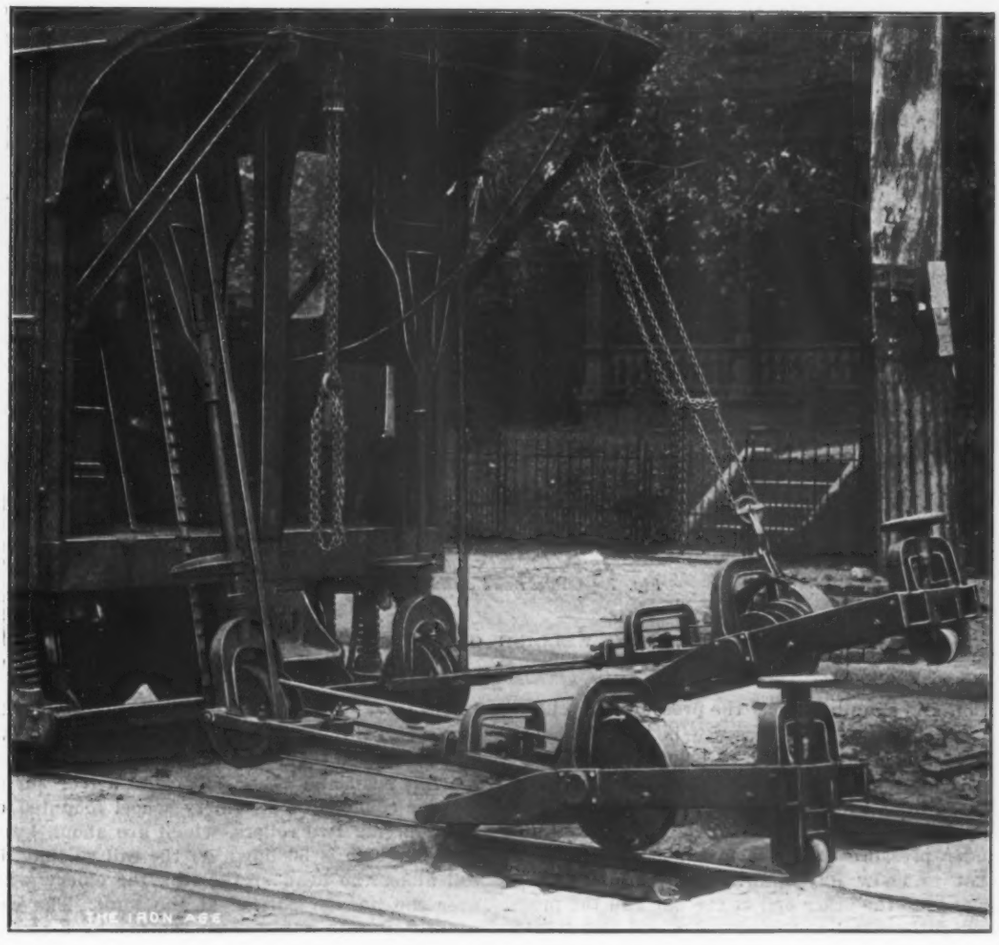


Fig. 5.—Grinding the Finished Joint.

ELECTRIC WELDING OF RAIL JOINTS.

In making a joint, flat rolled steel bars, Fig. 3, are used, having at each end a boss, *b*, or projection, on one side, which form the contact points between the bars and the web of the rail and confine the welded area to these sections. A flat strip of steel, B, ⅛ inch thick by 1 inch wide, is placed across the middle of the bars on the same side with the bosses. The bars are supported on small blocks and placed across the joint so that the

middle strip engages the web of both rails. The middle weld is a vertical one and made the full width of the bar; the end welds are horizontal.

The welding train of two cars is moved up to a joint. The welder is swung into place and the jaws made to press against the bars on each side of the rail. The current is then turned on and flows from contact to contact through the bars and the rail web. By altering the pressure on the jaws the resistance of the several junctures is increased and the whole is soon brought up to a welding heat. As soon as this point is reached the current is cut off and simultaneously the pressure is brought up to the full amount. The pressure is then loosened and the welder car moved back to bring the jaws opposite the extremity of the bars. The same process is again followed here, except that when the final pressure has been applied it is held there and the weld permitted to cool under pressure until the metal has cooled sufficiently not to show any glow. The welder is then moved forward to the other end of the bar and the process repeated, after which the welder is raised and moved to the other side of the car to engage the opposite joint.

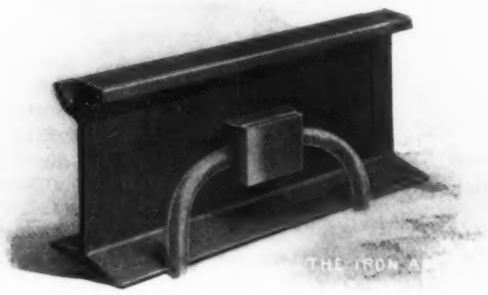


Fig. 6.—Bond.

By holding the pressure after the weld is made a remarkably tough weld is secured. It will be noted that only the end welds are thus treated. As the center weld is not subjected to any strain it is not essential to have toughness here. It has been found desirable to weld the ends of the bars while the bars are in an expanded state. By making the center weld first and not stopping to cool it under pressure the greatest elongation of the bars is secured. After the ends are welded and the bars cool off they shrink and exert a powerful pull to bring the abutting rail ends together, thus closing the slightest opening and leaving practically no joint at all. This is an important point in the manufacture of a continuous rail, for if the abutting rail ends are not brought firmly together the metal in the head of th erail will have a chance to flow into the opening between the rails, and this in time will cause a low spot in the head of the rail. As the bars are always in a state of tension it follows that the rail itself, inclosed between the bars, is in a state of compression. Any contraction of the rail itself between the joints will be transmitted to the end welds and it is therefore necessary to have these welds exceeding tough to withstand the strain. The object of the center weld is simply for vertical stiffness and to prevent any movement of the rail ends. The actual current used in welding is about seven volts and from 25,000 to 30,000 amperes.

In the car coupled to the welder is carried a rotary converter for changing the direct current from the trolley to an alternating current. The current in the primary coils of the welder is 300 alternating, 40 cycles. The direct current side of the rotary will take current from 325 to 600 volts from the trolley, and by means of suitable regulating apparatus the output on the alternating side, to the welder, is kept practically constant at 300 volts, without regard to the fluctuations on the line. On a line voltage of 500 about 225 amperes are required, or it takes about 125 kw. to make a weld, the current being on about two and a half minutes to each weld.

The third and last operation in the process consists in grinding the head of the rail to a true surface, Fig. 5. In welding new rail there is little need for this tool.

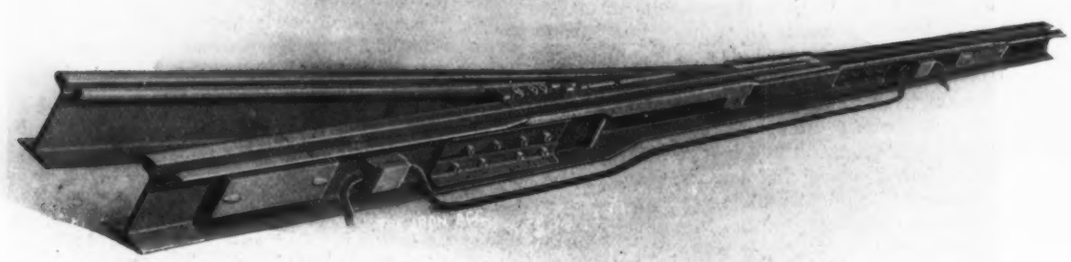


Fig. 7.—Cable Bond Around Switch.

ELECTRIC WELDING OF RAIL JOINTS.

In old track, where the rail ends have been battered, the receiving rail is purposely welded higher than the other. The grinder is then used to grind out the inequalities in the rail head and bring it back to a true surface. The grinder consists of an emery wheel mounted on a carriage having two rollers, which are about 4 feet apart. This carriage is let down on the rail so that the rollers roll along the head of the rail, the emery wheel being over the uneven portion at the joint. The carriage is connected with a motor on the car by a swing frame, thus enabling the operator to move the emery wheel back and forth over the joint while the car remains stationary. By means of a hand wheel the emery wheel is gradually fed down, and as it is moved forward and back grinds off the high places until the whole joint is brought to a true surface. The principle is very much the same as a carpenter's plane. With the final operation of grinding the joint is left complete.

Carried on as a continuous process, it takes from 12 to 15 minutes to complete a joint. The work is carried on day and night, about 80 joints in 24 hours being a fair average. The bars used are 1 x 3½ inches and 1⅛ x 3 inches, the length varying with the form of joint perviously used. On new rail, where the ends are left blank especially for welding, the length is 18 inches. On

old rail the bars must be long enough to reach back of the old bolt and bond holes, in some cases requiring bars as long as 48 inches.

In addition to welding joints the same apparatus is made use of in welding or electrically brazing copper ground cables to the rails, as shown in Fig. 6. For this purpose a copper block, about 4 inches square and about 1½ inches thick, with a suitable groove across one face to pass over the cable, is provided. The cable is placed against the rail web and the copper block over the cable. The welder is then brought into position. A Bessemer steel plate, about ⅜ inch thick, is interposed between the copper block and the contact of the welder. This acts as a "heat insulator," and enables the copper block to be brought up to a proper heat for brazing. Hard spelter is used. By this means a 500,000 C. M. cable can be attached to a rail so that the full carrying capacity of the cable is realized, the area of union between the copper and the steel being ample to allow for the difference in carrying capacity of the two metals.

The improved process of electrically welding rail joints and bonds has been in use since 1897. Further improvements were made in the winter of 1900, and the welding done the following season amply demonstrated the value of these improvements. While the breakage on all welding done had not exceeded 1 per cent., the breakage on welding done in 1901 was hardly one-tenth as great as before. Of 5308 joints welded in Rochester, N. Y., in 1901, there were but six broken rails in the spring of 1902. In no case has a joint broken through the bars or a weld pulled off; nearly all breaks have occurred through old bolt or bond holes beyond the bars. By welding bars long enough to reach over the holes this source of breakage has been avoided since 1900. The excellent showing made at Rochester, N. Y., on last year's welding proves to what a remarkable state of perfection the process has finally been brought. When it is considered that each weld depends on the judgment of the man making it, and that every bad weld must necessarily remain in the track, to be subsequently revealed when the strain of winter comes on it, and that but about one out of a thousand is a bad weld, it proves that by no other method of welding can such uniformity of results be attained. In the last three years the Lorain Steel Company have welded at Buffalo, N. Y., alone over 100 miles of track.

Drawback on Structural Pipes.

The Treasury Department, under date of September 16, has made the following ruling:

On the exportation of structural pipes manufactured by the Danville-Structural Tubing Company of Danville, Pa., wholly from imported old steel rails, paying a duty of $4 per ton, a drawback will be allowed equal in amount to the duty paid thereon, less the legal deduction of 1 per cent. The entry under which the merchandise is to be inspected and laden must show the marks and numbers of each shipping package, the gross and net weight, and also whether the pipe was manufactured directly from the rails or from billets made therefrom.

The manufacturer's declaration on the drawback entry must show the quantity and weight of each size of tubing exported, the weight of imported steel rails used in the manufacture of same, the amount of absolute waste and whether the tubing was manufactured from old rails or from billets made therefrom, and that the same was manufactured in the manner as set forth in the sworn statement dated August 9, 1902.

In liquidation the basis for allowance will be the net weight of the pipe or tubing, plus 5 per cent. thereto for absolute loss incurred in the process of manufacture for larger sizes of pipe made from old steel rails direct, and smaller size pipe, the net weight of the same, plus 9 per cent. for absolute loss incurred in the process of manufacture. Export weights shall be verified by a United States weigher.

The Crucible Steel Company of America, Pittsburgh, have secured a charter for the Crescent Steel Company, a subsidiary concern, in order to preserve and protect the trade name of the Crescent Steel Company.

Pacific Coast News.

SAN FRANCISCO, September 15, 1902.—Although not strictly speaking, a transaction in hardware or metals one of the most interesting transactions of the week perhaps has been the sale of the big five-story steel building on the southwest corner of Mission and Fremont streets, occupied by the Pacific Steel & Hardware Company, for the sum of $480,000. The building is one of the most striking that has been or is now being erected in what may be termed New San Francisco. It was erected for Miller, Sloss & Scott, whose consolidation with the old house of Geo. W. Gibbs & Co. formed the present firm. The purchaser is Henry T. Scott, one of the leading men in the new shipbuilding combine and one of the founders of the Union Iron Works and their great ship yard in this city. The Pacific Steel & Hardware Company pay somewhere about $25,000 a year rent for it.

Business in the hardware line has been quite good for the past couple of weeks, about 10 per cent. more than for the same time last year. Building operations are very active in San Francisco and the leading cities of the State, and the farmers and orchardists have begun to make improvements. In some sections, especially in the northern portion of the State, there will not be as good a business as might have been expected, owing to the fact that there was a great amount of fruit allowed to go to waste for the want of labor to pick it. During the past week or so the number and amount of contracts for new buildings recorded at the new City Hall were in excess of those for the week previous. A large number of immigrants are settling down in the State, making homes for themselves, who will require supplies of building hardware, nails, &c., and altogether the outlook for the fall trade in this department of business is very good. We are promised a new pipe line to parallel that of the Standard from Kern River to this city, which will take a great deal of Eastern pipe and other supplies, and the development which this will give to the oil business of the San Joaquin Valley will make an increased demand for everything in the line of oil well supplies.

San Francisco is threatened with the loss of some of its Northern trade by the withdrawal of the boat of the Oregon Railroad & Navigation Company from between this city and Portland. It is said that these boats have not paid, but some see in it the fine Roman hand of Manager Hill of the Northern Pacific. The result will be an advance in freights and perhaps a diversion of some of the trade done with San Francisco to the railroad. Of course it will not make any difference to the Eastern manufacturer, as the only goods that it could affect are those that have their origin in the East.

All our foundries and manufacturing establishments are very busy just at present, and there is a big demand for raw material. More pig iron has been received at this port from foreign countries during the past few weeks than has been sometimes in a whole year. The "Brenn," from Newcastle had 1350 tons; the "Adolf," from the same part, 500 tons; the "Ville De Mulhouse," Glasgow, 1270 tons; the "La Bruyere," Leith and Newcastle, 950 tons; the "Ellisland," Swansea, 550 tons; the "Deanmont," South Shields, 1000 tons; the "Manydown," Newcastle, 1050 tons, and the "Trafalgar," Liverpool, 300 tons. This is all since July 1, a total of 6970 tons. This is a testimony to the activity of our foundries and the scarcity of American pig in our foundries and machine shops.

The export trade still keeps up, especially to the Hawaiian Islands. Shipments to Alaska have about come to an end, at least those of any magnitude, as the season for navigation is over. The "St. Paul" has made her last trip and the last vessel of any importance for Alaska was the "Portland," which sailed a few days ago, and among her cargo carried an assortment of iron, steel and machinery. Among the other exports of the past couple of weeks were $20,537 in bicycles to Japan by the "Gaelic," $1,978 in machinery to Japan and $1151 to Manila by the same steamer and $3972 in machinery and $2511 in bicycles by the "Hong Kong Maru," mostly to Japan. Then the "Sonoma" had $1500 in agricultural implements for Australia, $1451 in

hardware for the same destination, $964 in machinery for Australia, $2927 for New Zealand and bicycles valued at $16 for New Zealand. J. O. L.

The Cuban Tariff.

WASHINGTON, D. C., September 23, 1902.—The announcement that the duty on certain important classes of machinery and implements imported into Cuba will be doubled in a few days by the expiration of a special rebate order promulgated by the War Department September 28, 1901, for the period of one year, has brought many inquiries to the State and War departments and to the Cuban Legation as to whether steps will be taken to extend this order. Interest in this question has been increased by the fact that, according to a recent press dispatch from Havana, the Cuban House has passed the bill originating in the Senate increasing the duties on about 45 items of the tariff from 30 to 300 per cent. An official of the Cuban Legation in commenting upon these inquiries said to the correspondent of *The Iron Age:*

"We have no advices with regard to the extension of the order referred to other than have been contained in Minister Squiers' dispatch to the State Department, in which he states that a bill providing for the extension has been introduced in the Cuban Congress but has not yet been taken up for consideration. With regard to the Senate tariff bill which the House has passed, it is our understanding that if it is approved by the President 25 days' notice will be given before it takes effect. The question is asked as to whether the tariff bill, if it becomes a law, will be promulgated unless the measure authorizing a loan of $35,000,000 is also enacted, but as this is an administrative question we have not been advised with regard to it. As these two bills are naturally of much importance to American shippers we regret that more definite information cannot be supplied at this time."

The officials of the War Department, who until recently were charged with the conduct of all matters relating to the Cuban customs and who issued the order of September 28, 1901, which is now about to expire, express the opinion that the order will not be extended at the present time, but may possibly be revived hereafter. One of these officials, in discussing the situation, said:

"The Department's order making the rate on certain machinery a nominal charge of 5 per cent was based on conditions prevailing in Cuba last summer. Planters were then rehabilitating old mills and constructing new ones, and the desirability of aiding them in every way was so generally recognized that when it was decided not to make a comprehensive revision of the tariff it was also determined to cut down the rates on sugar machinery, agricultural implements, &c. The situation in the island to-day is quite different from what it was a year ago, and it is quite possible that the Cuban Government does not regard it as necessary to extend this order at this time. Importations into the island of the articles covered by these paragraphs have not been very heavy of late, and it is possible that for diplomatic reasons, in connection with reciprocity plans, it is deemed desirable to permit the order to lapse."

With regard to the bill which the Cuban Congress has just passed and which apparently lacks only the President's signature to become a law, and which increases the duty on many articles chiefly imported from the United States, administration officials have recently expressed a decided change of sentiment. When the bill was first introduced in the Cuban Senate it was the almost unanimous view of officials here that the measure was an improper one in that it proposed to increase the revenue by raising the duties on the necessaries of life, and also because it constituted a discrimination against American commerce for the reason that the articles enumerated were principally imported from this country. Statistics have recently been laid before the officials of the War Department, however, which, it is asserted, have convinced them that the proposed increases will not limit consumption for the reason that the commercial organizations in the island have maintained such a high level of retail prices under the present tariff that they would be unable to increase these prices should the duties be raised as proposed. It is calculated that the wholesale and retail merchants in the island would be obliged to pay the total increased revenue, and this rather surprising statement is vouched for by no less an authority than Col. T. H. Bliss, late collector at the port of Havana.

With regard to the proposition that the projected tariff increases would constitute a discrimination against American commerce, the administration officials seem to have taken their cue from the President, who is reported as expressing some indifference as to the action of the Cuban Congress on the tariff in view of the failure of the American Congress to authorize the negotiation of a reciprocity treaty. The fact is also emphasized that the increase in the trade of the United States with Cuba during the past three years is due almost entirely to the abolition of the differential in favor of Spain which was in force prior to the Spanish-American War, and it seems to be the view of the administration that American exporters must content themselves with being put on an equality with those of other countries unless they can induce Congress to make a reciprocity arrangement. It is not difficult to see that the administration is bending every energy to the task of forcing through a reciprocity treaty at the coming session of Congress, and the officials are therefore disposed to wink at the efforts of the Cuban Government to emphasize the importance of the island's commerce with the United States by raising the tariff rates on our principal products. W. L. C.

The Agricultural Outlook.

Both the Government and the various commercial authorities agree that the corn crop has suffered considerable damage from frost, especially in the northern section of the corn belt, but the latest reports indicate that the damage has been overestimated. Fifteen per cent. seems to be a conservative estimate of the loss sustained by the Nebraska crop and possibly as much, if not more, by the Iowa crop. The frosts which have occurred more recently seem to have assisted the maturing of the crop rather than otherwise, and it is significant that the corn market has reflected little interest from the principal corn States, indicating that those who are best informed are not enrolled on the buying side of the market.

Well distributed rains have visited the winter wheat belt section west of the Mississipi recently, where fall plowing had previously been retarded by dry weather. These conditions have permitted farm work to be pushed rapidly and the ground will soon be in condition to receive the winter seed. Reports are received that the winter wheat acreage will be large, espcially in the Southwest, and a continued free movement of wheat to market is reported. Yet statistics have not fully borne out these advices regarding the movement of wheat, but a much freer marketing is expected, especially in the Northwest. Advices from the Argentine Republic are somewhat interesting as affecting the wheat market, as since January 1 the shipments from that country have been only a little over 18,000,000 bushels, as against 30,000,000 bushels at the corresponding time a year ago. On the other hand, advices from Russia indicate that a crop is being harvested which will probably prove the largest in ten years. It is necessary in determining the wheat situation to always keep in mind the conditions in foreign countries, and this is more especially true with wheat than with any other crop raised.

Picking of cotton is reported to have generally advanced rapidly throughout the cotton belt and under favorable climatic conditions, but there is a scarcity of labor in the cotton fields. Very cool weather early in the week is reported to have checked the opening of the bolls in the central and western portions of the cotton section.

Generally considered, there is nothing but encouragement for manufacturers to be derived from the agricultural outlook.

The American Steel Casting Company's New Plant at Alliance

When the new plant for the American Steel Casting Company, Alliance, Ohio, was contracted for by Riter-Conley Mfg. Company the old plant consisted of three 15-ton furnaces and one 10-ton furnace, provided with a light platform. The furnaces were charged by hand and were supplied with gas from producers situated close to the furnace. The building covering the furnaces, platform and gas producers had a low, wooden roof and was 55 feet wide. The building opened into the pouring room on one side, while the other side was inclosed by a brick wall, part of the building being used for sand storage and sand mills, the whole giving a construction very close, there being no ventilation for the producers or furnaces. Mechanical draft was provided from the air compressors, which enabled the men with difficulty to carry on the work. The furnaces were of the old type, with short hearths and ports and shallow checkers located under the furnaces. In this construction the gas is not fully consumed, the cost of fuel being much more than what it should be. The construction was such that the gas entered the furnaces and was carried through at an elevation of about 8 inches above the bath, instead of at the same elevation, the ports not being long enough to give direction to the gas. The regenerators were very shallow, located under the ports and furnaces. The furnaces having no slag pockets the regenerators acted as such and rapidly choked up, seriously interfering with their efficiency and making frequent removals necessary. The valves were the old style butterfly valve. The furnace doors were operated by hand with levers. The charging of the furnaces was also done by hand at a very high expense. The gas producers were also old style with no water seal and were charged by hand.

The New Plant.

The new plant was built by the Riter-Conley Mfg. Company from designs furnished by the American Steel Casting Company. It is laid out to provide for five 10-ton furnaces, 50-foot centers, so arranged that the first two can be put into operation without interfering with the old ones. The new plant is provided with a furnace building, 70 feet wide and 40 feet high under the truss, with a 10-ton crane over the furnaces, charging floor and stock yard, spanning the whole building. A charging machine is provided, with a large and substantial platform, the trolley wires for the machine being under the platform, so as not to interfere with the handling of the charging boxes from the stock yard to the buggy. The gas producers are located in a separate building about 40 feet from the furnace building, so as to provide room for the stacks for furnace, flues, storage of stock, &c. This building is provided with 10-foot diameter gas producers (two to each furnace), water sealed—a combination of Duff and McConnell types, the construction being similar to that of the Sharon Steel Company, which proved very satisfactory. Each furnace is provided with a stack 5 feet in diameter and 100 feet high, lined with 4½-inch brick to the top, located as near to producer house as possible, so as to allow maximum room for storage of stock, at the same time being close enough to the furnace to allow of proper draft.

A peculiarity of the plant is that the stock house and charging room are in one span covered by one crane, the charging platform reaching to within 24 feet of the side of the building. This allows room for double tracks, each being 270 feet long, so that from 14 to 16 cars of stock can be on these tracks at the same time. In this way these cars can be unloaded directly into the charging boxes, thus saving the cost of a second handling of stock which is not put into storage. Stock can be stored alongside of the building for its full length, as well as in the yard, beyond the tracks and away from the building.

The open hearth building is a steel frame with steel trusses and purlins covered with pine and No. 1 hard vein sea green slate. The sides are covered with sheet iron from the eaves to within 10 feet of the platform, or 24 feet from the ground, thus allowing ample ventilation. The gas producer house is a steel frame covered with corrugated iron, and the roof and sides are more or less open to provide for ventilation. A track is provided for within this building, but the coal must be handled by hand to the platform and from there to the producers. The building, however, is so constructed that an automatic coal handling plant can be added at any time. It was recommended that this plant be put in at once, and it will probably not be long until this recommendation is carried out.

The Furnaces.

Each furnace has a nominal capacity of 20 tons, although its actual capacity is about 25. The hearth is 21 feet long by 9 feet 8 inches wide, the highest point of the roof being 8 feet 7 inches from the top of the steel work. The ports are 5 feet 4½ inches long, being twice as long as those of any other furnace of the American Steel Casting Company at any of their plants, but the contracting engineers say that it would be well if they were considerably longer, say 7 to 8 feet, in order to give proper direction to the gas and air. Each port has two uptakes from the gas regenerator and three from the air regenerator, each 13½ x 27 inches. Each gas uptake connects to its own flue, 13½ x 15 inches, this flue being 7 feet 3 inches long, inclining toward the hearth of the furnace 1 foot 9 inches in length of the port, which is 5 feet 4½ inches. The three air uptakes enter into one chamber 10 feet wide, 1 foot 3 inches high, the length being the length of the port and forming a sheet of air over all the hearth in the furnace. The end wall in the furnace is inclined to allow the air more readily to be forced down to the bottom of the furnace. The binding consists of double channel buck stays with the intervening tie rods 2 inches in diameter. The hearth is made of 12-inch channels, the flanges resting on 12-inch I beams, the channels being separated ¼ inch to allow for expansion.

Each furnace is charged through three doors in front, each door being operated by a hydraulic cylinder above it. No doors are placed in the tapping side of the furnace, although some are almost always placed there to facilitate examining and repairing the furnace. The charging is done by means of a Wellman-Seaver high type charging machine, using 6-foot charging boxes. The floor is well constructed, the plates being ½ inch thick.

The regenerators for each furnace consist of one for air 9 feet 1 inch wide, and two for gas, each 8 feet 1 inch wide, all being 13 feet 1 inch high from the bottom of the regenerator to the highest point of the roof and 12 feet 10 inches long. The checkers are 10 feet deep, having about 90 cubic feet of checkers per ton of steel. The efficiency of these checkers is somewhat retarded on account of slag pockets being located in the upper part of the chamber, although this construction is considered objectionable by the contracting engineers because the slag finds its way into the checkers, choking them up. It would have been better, they say, to have located the regenerators under the platform, but away from the furnace. This would have allowed greater depth of checkers and shorter length, thus giving greater efficiency. A greater advantage, however, is that the slag pockets would then be located under the uptakes, below the furnace but away from the checkers. Here the slag can easily be removed during the shut down over Sunday, and at the same time this construction prolongs the life and efficiency of the checkers three or four times over. The air and gas regenerators are connected to the stack by a 27-inch water seal, having reversing valves of the Forter type.

The Gas Producers.

The gas producers are 10 feet in diameter inside the shell and 14 feet 10½ inches high from the bottom of the pan to the top of the water cooled plate. They are filled in the center, the top being water cooled and the bottom fitted with a 4½-inch water seal. The blowers are of Eynon-Evans make, the air being forced through a 1-inch steam pipe connection. The air mixes through

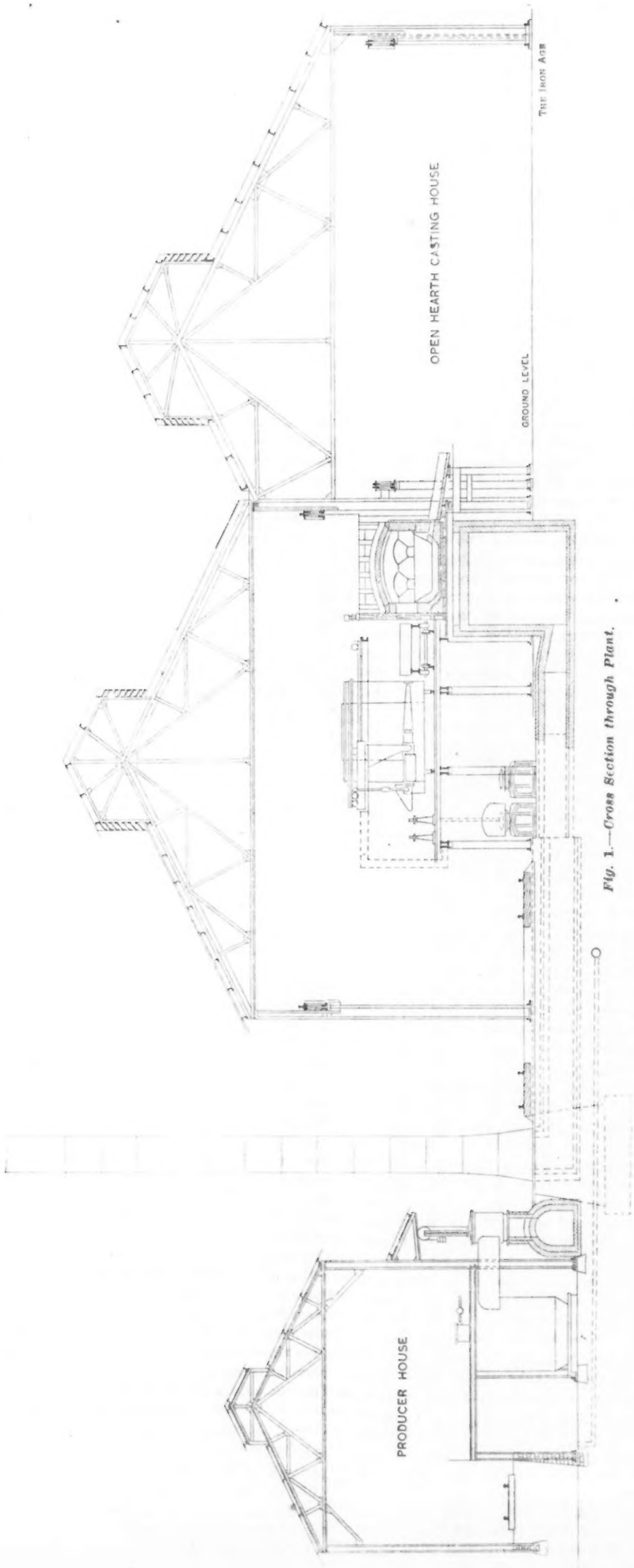


Fig. 1.—Cross Section through Plant.

THE NEW PLANT OF THE AMERICAN STEEL CASTING COMPANY AT ALLIANCE, OHIO.

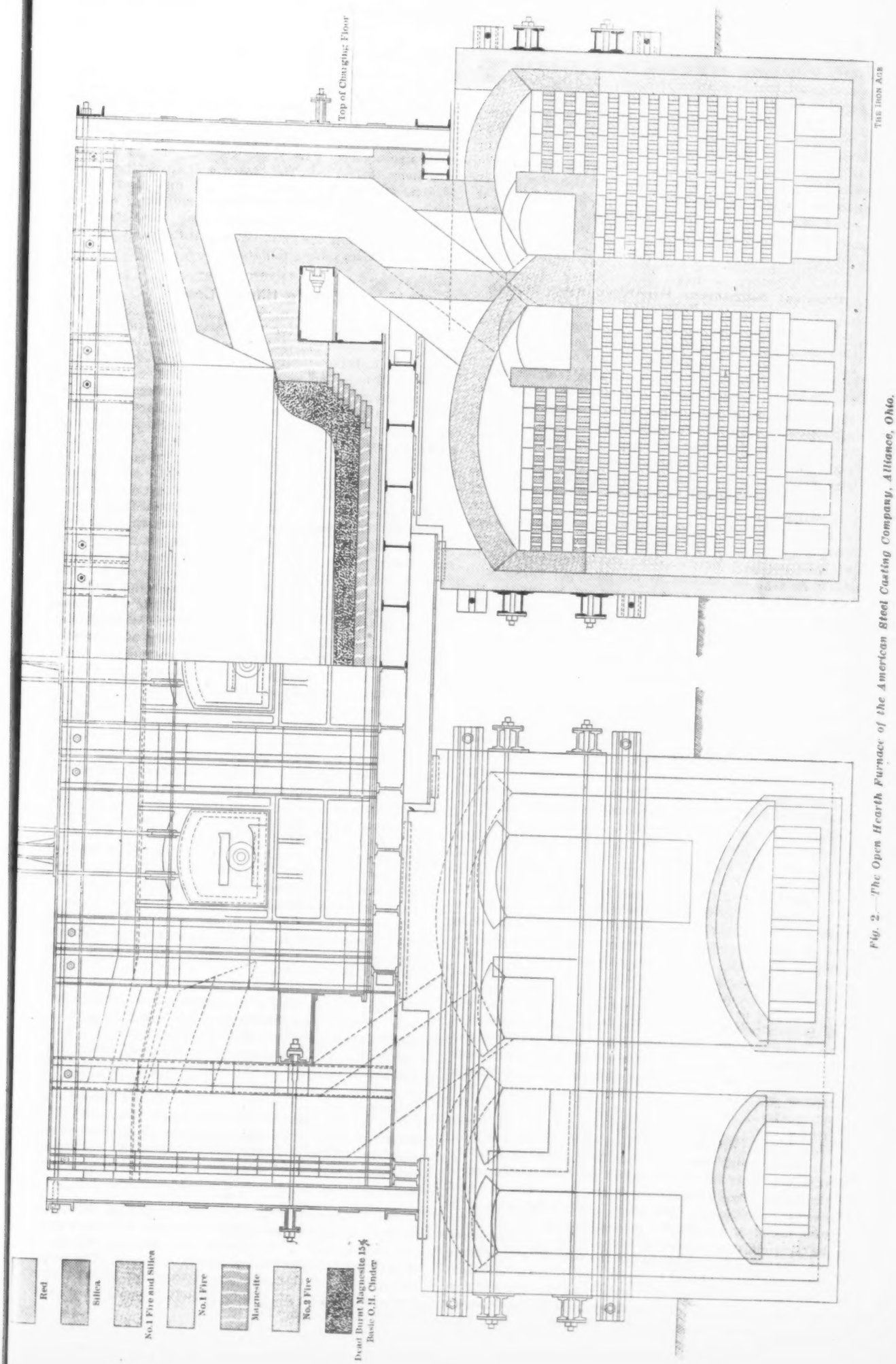


Fig. 2.—The Open Hearth Furnace of the American Steel Casting Company, Alliance, Ohio.

a cast iron cone grate, located in the center of the producers and built up of cast iron rings, allowing ⅜-inch air space between them. The gas leaves the producers through a flue at the top and is carried through a soot valve to the main underground flue, to which all producers and furnaces are connected. The main advantages of these producers are stated as follows:

1. Water cooled top, thus keeping the platform more comfortable for the men. 2. Water sealed base. 3. The ashes can be removed from a producer from any point in its circumference. 4. The cone grate spreads the blast very equally throughout the coal, forming better combustion and making more gas. 5. Each producer is provided with a soot valve so that it can be cut off from the main flue without leakage. 6. The door in this soot valve casing allows the cleaning of the plate flue between the producer and the soot valve.

Practical Suggestions Regarding Open Hearth Furnaces.

In this connection the contracting engineers suggest that the main points to be considered in building open hearth furnaces are as follows:

1. The hearth should have 9 square feet for every ton of steel. 2. The hearths should not be much over 15 feet wide, as a man cannot throw magnesite or dolomite further than this through the doors, and because it is hard to hold the roof of a much larger span. 3. The ports should be long enough to give the air and gas direction, having only one gas port and one air port, the latter with two uptakes, so constructed that a sheet of air will be spread over the hearth of the furnace. 4. Ninety cubic feet of regenerator space should, when possible, be allowed for each ton of steel, two-thirds for air and one-third for gas. The regenerators should be made as deep as possible, as the efficiency varies with the depth. 5. The regenerators should be under the platform, not under the furnaces. 6. All flues, except those leading from the uptakes to the furnace, should be large, thus preventing the choking and cutting of the brick work of the flues on account of the hot gases. 7. The gas flues leading from the uptakes to the furnace should be small and sloping toward the hearth, widening out as they come toward the furnace and the roof flue drooping slightly so as to spread the gas over the hearth of the furnace. 8. The uptakes should have a false arch built on their back wall, so that when they are cut they can be easily repaired without tearing down any other part of the furnace. 9. The binding of the furnace should be amply strong, using thick rolled steel shapes wherever possible. All walls should be bound on the ends. The skewbacks of all arches should be braced by the binding. The binding of the ports is the most important, for if they are not properly bound the expansion of the brick wall will allow the air and gas to mix before entering the furnace, resulting in the burning out of the ports. 10. In regenerators the ends of all outside and partition walls should be bound, as should also the skewbacks and ends of the roofs. 11. The stack should be amply large, allowing the damper to regulate the draft. 12. No part of the furnace should extend below the lowest point at which the water can be taken care of. 13. The foundation should be built of first-class masonry, preferably hard red brick laid in cement or concrete. 14. All underground flues which are not protected by clay should have a course of red brick. 15. Basic open hearth furnaces should have either fire or magnesite brick in the hearth. Fire brick can be substituted for magnesite from the top of the pan to the lower part of the bath. Magnesite brick should be used around all sides of the furnaces, from the lower part of the bath to the top of the metal line. The balance of the side walls and roof should have No. 1 silica brick. This brick should be used wherever a high, even temperature is had. 16. Silica brick should not be used in such places as in regenerators, as they will crumble under the varying temperature. No. 1 fire brick should be used. 17. Chrome brick can be used in the bed of the furnace, as they do not fuse under high temperature and they hold the heat in the bed, but should not be built into the walls, as they have no bond with themselves or with other brick. They are excellent brick for the back of the uptakes if they could be held in place, as they are not easily cut by the slag. 18. As the valves of the furnace cause the furnacemen much trouble, they should be so constructed that they can be reversed quickly without leakage, as all leakage of gas in the stack is waste. All parts of the valve should be protected wherever possible and they should be so constructed that they can be easily repaired. 19. The doors and door frames of the furnace should be water cooled. The water cooling of the frames lengthens their life. The water cooling of the doors is done so that the smelter can look into his furnace without burning his face and thus take better care of his furnace. The cost of maintaining these doors is more than that of the plain doors, but the saving in repairs more than offsets this item.

Coking Illinois Coal.

Much interest is being manifested by consumers of coke in the West concerning the effort to manufacture a coke from Illinois coal that can be satisfactorily used in blast furnace and foundry practice, and the efforts of the Weaver Coal Company of Chicago to make such a coke on a commercial basis will be followed closely. The reported connection of the Illinois Steel Company with the recent purchase of coal land in the Carbondale district by the Weaver and Gates interests proves to have been erroneous. It was a natural supposition, however, as some time since the Illinois Company acquired over 5000 acres of land in the immediate neighborhood. They have also acquired during the past few days additional land adjoining the property originally purchased. This latter tract of land would have been transferred to the Illinois Company long since had the title been clear. While there is no connection between the Weaver Coal Company and the Illinois Steel Company purchases, it is evident that if the Weaver Coal Company can demonstrate the feasibility of manufacturing coke from Illinois coal on a commercial basis and of a quality suitable for furnace use the Illinois Steel Company will be quick to avail themselves of the advantages offered. The fuel question is one of, if not the most, important now before the iron and steel industries in the prairie States, and the rate of their develop-ment largely depends upon the solution of the problem how to obtain coke at a low price and in sufficient quantity to stimulate the production of iron and steel. Recent mechanical devices have made it possible to place iron ore in blast furnaces along the lakes at very low cost. If now the cost of fuel can be reduced in the same proportion the iron and steel industries of the Central West, more especially the prairie States, will be placed on at least an equal footing with districts in the older sections of the country.

The Weaver Coal Company have changed their name to the Weaver Coal & Coke Company since making the above purchase and increased their capital stock from $1,000,000 to $3,000,000.

Elmira Rolling Mill in Operation.—The puddling furnaces of the new Elmira Rolling Mill Company on Grand Central avenue, Elmira Heights, N. Y., were fired September 2 and are now running full time. The finishing department of the mill was not started until the present week. The entire mill will be in full working order by October 1. The product turned out will be a high grade of refined merchant bar iron. The officers of the company are as follows: E. E. Buchanan, president; Irving D. Booth, vice-president; N. D. Doxey, treasurer and general manager; Jesse L. Cooley, secretary.

The Pennsylvania Railroad are preparing estimates for the number of new freight cars they will have constructed in 1903. It is believed the company will have built in the neighborhood of 12,000 new cars. The number constructed this year was upward of 20,000. The new cars will be of 100,000 pounds capacity at a cost of over $1000 each.

The Iron Age

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The Weakness of the Trusts.

In the discussion of the "trust" problem, which has become so active lately through President Roosevelt's speeches, one striking misapprehension crops up again and again. President Roosevelt himself seems disposed to confound mere size with strength, and refers to "the smaller and weaker rivals." In the early days of the movement the cry of monopoly was prevalent. Now that it is pretty thoroughly understood that very few of the consolidations or "trusts" possess control, popular opinion persists in regarding them as exceedingly dangerous because they are big. It will be found by a study of the facts that many of the so-called trusts are balloons with extremely attenuated walls, which are exceedingly difficult to steer and may collapse as the result of a very small puncture.

As a matter of fact, the magnitude of many modern trusts is a serious source of danger to them in more ways than one. Their excessive capitalization may warp the judgment of the managers because they are forced to seek to make profits on fictitious capital. The managers of many trusts must thrust aside all other consideration of broad policy and long headed development for the sake of declaring dividends on deluged stock issues, particularly in the period during which bankers, promoters and insiders are engaged in marketing the securities. Their overcapitalization is a serious element of weakness.

Aside from this the very magnitude of their operations is fraught with possible embarrassment. It requires men of extraordinary talent, energy and experience to handle such great enterprises and the risk that men of inadequate capacity reach the top is correspondingly great. Even when the right men are at the head there is always the possibility that the care of their own great personal interests may divert them from giving the necessary energy to the affairs of the consolidation.

The fact is now generally recognized that the modern trust has come to stay, but it is a question which the next depression will solve whether their true capacity for good or for evil can develop until they have been stripped of the dead tissue which encumbers their bodies. The majority of them, loaded down with extravagant valuations of plant and equipment, are weak, and the great danger to the industrial welfare of the country does not lie in the abuse of their power, but in their agonies preceding and during their reconstruction on sounder lines. Every manufacturer and every trader knows what the competition means of a rival who is facing a losing business. The smaller producers outside the trusts, strong though they may be in every respect, will suffer keenly during such a struggle, and the greatest danger to them in the future does not lie in the strength, but lies in the very weakness of many of the trusts. Even during the great prosperity of the past few years in the iron trade some branches of it have felt the effects of the erratic course pursued by consolidations unable to meet contingent fixed charges. This has given an inkling of what may occur when the day should come when it is not a question of accepting business urgently offered, but when it is the problem of supplying factories with even a moderate amount of work. It is a mistake to assume that the trusts have decreased competition. On the contrary, the potentialities in that direction have grown, and under certain conditions will develop an acuteness of which we have heretofore hardly dreamt.

It is one of the most hopeful signs for the future that the consolidations are utilizing the present era of exceptional prosperity to strengthen their position. Nearly every one of them is accumulating an ample surplus fund, and is busily engaged in making good originally excessive valuations of plant by extensive improvements. An examination of the affairs of practically every trust will, we believe, show that their financial and physical condition is very much better to-day than it was when the consolidation was effected. To that extent there has been notable and satisfactory progress. But much remains to be done in that direction before the sins committed during the heyday period of organization are atoned for and the trusts are as sound as they are big.

Important Legal Developments.

Two important legal matters, both of great interest to the public, were settled during the past week. One was the dismissal of the Berger suit against the United States Steel Corporation and the other was the opinion by the Attorney-General of Iowa in favor of the new Rock Island Railway Company. In the former case the New Jersey Court of Errors and Appeals, the highest tribunal of the State, decided emphatically that the corporation had not committed a wrong against any of the stockholders by the adoption of the plan to convert part of the preferred stock into bonds. This suit was contested by eminent attorneys on both sides, and the arguments of the counsel for the complainant were presumably as powerful as the case permitted. It can therefore be accepted as conclusively settled that corporations chartered by the State of New Jersey have the power to take such action as that taken by the United States Steel Corporation. The directors of the corporation are now expected to proceed with their plans to secure additional capital with which to make the contemplated extensive improvements in a number of their plants. In the second case the Governor of the State of Iowa announced that he would not permit the Chicago, Rock Island & Pacific Railroad Company to organize the Rock Island Railway Company for the purpose of greatly increasing the bonds and stock of that system. The Attorney-General of the State was instructed by him to investigate the matter and to take immediate proceedings to prevent the consummation of the project if it was found to be contrary to law. Upon investigation the Attorney-General decided that proceedings against the company on this ground could not be maintained. While it may be held that this latter case is of most interest to Wall Street, it nevertheless has such an important bearing on the general business situation that it is worthy of the most serious consideration. The multiplication of securities is proceeding at a more rapid rate than ever before in the history of the country. The Rock Island example is likely to be followed by other great railroad systems. Is there not danger that this creation of new securities may be carried too far for the safety of our financial fabric?

The World's Production of Iron and Steel.

We have of late received so many inquiries regarding the world's production of iron and steel that a fresh compilation of statistics bearing on this subject has seemed exceedingly desirable. The ground is not entirely new, but has been well tilled by James M. Swank, J. S. Jeans and others. Nevertheless, the information is desired in a different form from that in which it has at any time been published and this has entailed considerable labor and no little research. It is believed that the statistical statement which is herewith presented will have more than passing interest to our readers generally. The figures given cover the last half century, from 1850 to 1900, and take in only pig iron and steel. It is not claimed that all the figures given are strictly accurate, as in some instances it has been necessary to make estimates from the best data obtainable. In the matter of steel, while most of the figures refer to ingots, especially in later years, some are known to have referred to finished steel. Nevertheless the tables given are of value for purposes of comparison. Efforts have been made to put all figures in gross tons.

Taking up pig iron, the world's production in 1850, according to countries, is believed to have been about as follows:

Pig Iron Production in 1850 by Countries.

Country.	Gross tons.
Great Britain	2,300,000
United States	563,755
France	405,653
Germany and Luxemburg	350,000
Austria-Hungary	250,000
Russia	227,555
Sweden	150,000
Belgium	144,452
Other countries	10,000
Total	4,401,415

The world's production for each fifth year from 1855 to 1900 is given in the following table, which shows how rapidly the output has grown in the last half century:

World's Pig Iron Production, 1855 to 1900.

Year.	Tons.
1855	6,150,000
1860	7,400,000
1865	9,250,000
1870	11,900,000
1875	13,675,000
1880	17,950,000
1885	19,100,000
1890	27,157,000
1895	28,871,000
1900	40,087,616

The production for 1900 was divided as follows among the several countries producing pig iron:

Pig Iron Production in 1900 by Countries.

Countries.	Gross tons.
United States	13,789,242
Great Britain	8,959,691
Germany and Luxemburg	8,381,373
Russia	2,859,815
France	2,669,966
Austria-Hungary	1,431,989
Belgium	1,001,872
Sweden	518,263
Spain	289,315
Canada	86,090
Italy, Japan, Mexico, &c	100,000
Total	40,087,616

Turning to steel, it is remarkable how little the world used so recently as 1850. Its production at that time was limited to the old processes of crucible conversion, cementation or puddling. Necessarily, but small quantities were produced at each heat or operation and the cost was high. Not until well into the decade after 1860 was steel produced to any extent in large quantities by the Bessemer or open hearth process. The manufacture of Bessemer steel on a commercial scale began in England in 1857, and in this country in 1865, while open hearth steel began to be made on a commercial scale in England in 1864 and in this country in 1868. According to the best information at hand, it is believed that in 1850 the world's production of steel was not over 85,000 tons, distributed as follows:

Steel Production in 1850 by Countries.

Countries.	Tons.
Great Britain	40,000
France	15,000
Austria	14,000
Germany	10,000
Russia	2,000
United States	2,000
Sweden, Belgium, &c	2,000
Total	85,000

From that time the world's production of steel for every fifth year is given in the following table, the figures for the period up to 1875 being necessarily based on estimates for some countries:

World's Steel Production, 1855 to 1900.

Year.	Tons.
1855	120,000
1860	200,000
1865	350,000
1870	700,000
1875	2,000,000
1880	4,274,000
1885	6,147,000
1890	12,231,000
1895	16,449,000
1900	27,130,815

The details of production for 1900 are as follows:

Steel Production in 1900 by Countries.

Country.	Gross tons.
United States	10,188,329
Germany and Luxemburg	6,257,745
Great Britain	5,050,000
Russia	1,800,366
France	1,569,481
Austria-Hungary	1,126,942
Belgium	644,132
Sweden	295,636
Spain	148,184
Canada and other countries	50,000
Total	27,130,815

The statistics of pig iron and steel production in 1901 have not yet been published for quite a number of countries, hence the totals for that year are not available. Very interesting deductions can be drawn from the tables which are here presented, but these are left for our readers.

The Demand for Scrap.

Foreign iron and to some extent foreign steel for the time being has assumed the role of arbiter of the destinies of our markets. Present indications, too, point to the probability that foreign metal will continue to be one of the most important factors in the manufacturing industries of this country for some time to come.

Much prominence necessarily has been given recently to the importation of European pig iron, steel billets and structural shapes, but now comes the interesting news that foreign scrap iron and steel has been purchased in liberal quantities for importation, one firm at Chicago alone being reported to have purchased a very large tonnage of old iron rails, railroad wrought iron and heavy melting steel scrap. Some of this material will doubtless come into the country via the Atlantic seaboard, but some portions will come into the prairie States via Canada, and other shipments are known to be destined to Gulf ports and from there by water and rail to points in the Mississippi Valley. The high prices prevailing for all kinds of domestic scrap used by rolling mills and open hearth furnaces alike have invited and permitted such transactions at a profit. The relatively light available supply of suitable domestic material, too, insures a hungry market here for European scrap metal for several months at least. The rapid increase in the number of open hearth furnaces in the Central West during the past year and a half, too, demands a larger supply of scrap as well as of pig iron.

CORRESPONDENCE.

The Economy of the Long Cooling Bed.

To the Editor: In the last issue of your paper a scientific engineer has taken exception to what an unscientific engineer stated in one of your recent issues in regard to economy of the long cooling bed. The unscientific engineer, in plain, clear statements, drew certain conclusions based upon the product of the entire mill for one year being rolled into bars 400 feet long. In doing this he was favoring to a great degree the results to be obtained from a 400-foot bed, because it is a well-known fact that on certain sizes the mills do not roll bars the full length of the bed. For instance, take 1¾-inch rounds; a bar 400 feet long would weigh about 3200 pounds. This would require a 4-inch billet about 60 feet long; this the unscientific engineer should have mentioned in his previous article, and he should also have stated that not more than 60 per cent. of the bars are rolled the full length of the bed. Instead of this, however, to place the question of the long cooling bed in its most favorable light, he assumed that every bar rolled during the entire year was the full length of the bed in both cases—namely, that of the 200 and 400 foot beds—and he waived all the disadvantages of the use of a 400-foot bed at times when bars are not rolled the full length. In my calculation I estimated that the crop ends would be only 3 inches long and this was based in both cases, and I still maintain that with good management, even though 70 per cent. of the product be cut into special lengths, 3 inches at each end of the bar is ample allowance for crop ends; this being based upon the scientific engineer's own assertion that 30 per cent. of the product of a bar mill is taken in ordinary lengths. But it appears that we differ in our calculations, the one claiming that 3 inches is the loss in crop ends and the other claiming that the average crop end on each bar rolled during the entire year is 4 feet 6 inches long. This is so preposterous, so far from the actual facts and something that no rolling mill man would admit for one minute that further comment upon the subject seems superfluous.

The scientific way in which he figures this out reminds me of a man who was in very reduced circumstances, so much so he had to get credit for the food he bought. Among other things he bought one dozen eggs, receiving credit for them. After this he immediately left for the gold fields, returning to his native town after an absence of about ten years a millionaire. He then called in all the debts he owed, and among others there was a bill presented him for the dozen of eggs which amounted to a great many thousand dollars. The millionaire remonstrated, saying he was willing to pay the highest price for the eggs bought and compound interest upon them, but the bill presented was entirely unreasonable. The reply was as follows: "If I had taken those 12 eggs sold you and set them under a hen, in due course of time I would have had 12 chickens, all hens; those chickens in due course of time would become hens, then in time these hens would lay so many eggs and these eggs would become chickens, all hens; and I figure that in ten years the bill would have amounted to a great deal more than the one I presented you." This is a scientific method of getting at the cost of a dozen eggs, and the scientific engineer has adopted the same course in figuring out his crop ends. The man who sold the dozen eggs claimed that every egg would bring forth a chicken and every chicken would become a hen; the scientific engineer claimed also that every bar rolled the full length of the hot bed and every bar sheared would have 4 feet 6 inches of a crop end. I will make this assertion: If we were to pick out the oldest rattle trap of a mill in existence to-day in this or any other country upon the face of the globe having hot beds not longer than 30 feet, even then under these conditions the average crop end of each bar would not be 4 feet 6 inches long. No foreman in charge of any rolling mill in the world could hold his position 24 hours if for one single day the average length of his crop ends was 4 feet 6 inches.

When I was a boy, some 40 years ago, we used hot beds not longer than 40 feet and cut the bars into specified lengths, say 12, 14 or 16 feet, and if the last length of the bar was 2 feet longer, more or less, than the length called for, the end was cut off and this bar was laid at one side and sold to others who did not specify any length. This is so well known that I venture to say there is not a water boy in any of our rolling mills who is not aware of this fact.

Seeing that automatic means are used for cutting bars 200 feet long, same as in cutting bars 400 feet long, I cannot see where there is any reduction in labor. In reference to increased tonnage owing to long lengths I will state that to the best of my belief the tonnage made by a mill having a 200-foot hot bed and rolling everything made from a 4-inch billet is equal to or exceeds that of a mill having a 400-foot hot bed. That the longer the section rolled the greater the tonnage and the less the cost of manufacturing, I question, seeing that it is a well-known fact that scientific continuous rod mills are in operation in this country to-day that start with a billet weighing 300 pounds and produce a maximum of 120 tons in a single turn, while there are some rod mills of the Belgian type in this country in operation to-day that use a 150-pound billet and produce a maximum of 260 tons in a single turn, and judging from the popularity of the rod mills of the Belgian type they must produce at a lower cost. Taking it altogether, we think that the long cooling bed will not pay for itself in a reasonable time. UNSCIENTIFIC ENGINEER.

Arbitration.

To the Editor: In consideration of the different views expressed in your issue of the 18th inst. respecting arbitration, particularly on page 5, I beg to add that there seems some misconception. Controversy necessitates a tribunal. Jurists may sometimes be venal. "The pity o' it." But it is the exception, not the rule. A satisfactory solution of any controversy is never arrived at through the medium of antagonism. It is proper to get together and settle differences, but is it done? If so, whence all this strife? Consider the magnitude of the evil.

An arbitor is not a factor in the case until after both parties have exhausted their resources in order to secure an adjustment and have failed. The higher the branch of skilled labor the nearer they are likely to attain satisfactory results, because the mental evolution which engenders skill is also likely to generate prudence. But that is only a part of the scheme of arbitration. If still they cannot agree is it then their prerogative to select a capable and unimpeachable man as arbiter and place before him all the facts and details, to enable him thoroughly to understand the case, thus placing him in a position to arrive at a just decision. If the outcome of this is not preferable to the misery, hatred and bloodshed engendered by strikes then who shall show us something better?

Compulsory legal measures should be available on the basis that strikes must cease, or that their duration may be tolerated only so long as to admit sufficient time to negotiate a settlement. It is the duty of the Commonwealth to see to this in so far as that though contending parties continue intermissions until a logical termination is effected without delay in the interest of all within the radius of their influence. JOSEPH PARKES.

TOLEDO, OHIO, September 20, 1902.

The Whitehead Machinery Company, Davenport, Iowa, have purchased the second-hand machinery business, inclusive of stock, of the W. W. Whitehead Company of the same city. The Whitehead Machinery Company will carry a line of second-hand engines and boilers, heaters, pumps, &c.

In the United States Circuit Court, at Pittsburgh, last week a bill in equity was filed by the Westinghouse Machine Company against the Keystone Engineering Company, alleging infringement on a patent for improvements on the operation of gas engines. An order restraining the defendants from further infringement is asked.

Worcester Manufacturing Interests.

WORCESTER, MASS., September 15, 1902.—The summer depression in the iron and steel manufacturing business of Worcester is at an end, and every one is well contented with the fall and winter outlook. The strike of the machinists seems a good way back in history. The men are at work, and their satisfaction at ending their troubles with their employers continues unabated. The F. E. Reed Company and Prentice Bros. Company have caught up with their orders, and the effects of the strike upon their business are no longer felt. Orders are coming in with satisfactory rapidity, and the shops are running full time with full force of men. The same is true throughout the other machine shops of the city. All report business to be of the best.

Inquiry at the offices of the large machine tool establishments has brought the information that the advance of 10 per cent. in prices made two months ago has not resulted in a falling off of orders. It was pointed out to *The Iron Age* correspondent that most orders received during these times of rushing business come direct from the machine shops and are not placed through the machinery houses of the large cities. The users of machine tools are all busy. An instance of this is the Crompton & Knowles Loom Works of Worcester, who are so rushed with business that they are buying largely of new tools. So are the engine builders and, perhaps most important of all, the various manufacturers of electrical machinery and supplies. The European business of the Worcester machine tool people has about doubled during the past 12 months, they estimate, and this is another reason why the advance in prices need not decrease the volume of their business. In times when orders have to be worked for low prices are an advantage, one of the largest machine tool manufacturers says, but in busy times it does not matter very much. This statement reflects the opinion of manufacturers generally in this section of New England.

The Washburn & Moen department of the American Steel & Wire Company have had an exceptionally good summer, although there was somewhat of a depression in the wire business proper. The demand for most of the specialties kept up, so that few men were laid off, and in some instances double shifts were kept going. A considerable part of the wire drawing department of the North Works was shut down for ten days, throwing 400 men out of work, because of the breaking of the 12-inch main shaft of the big Greene engine. The independent wire companies report similar excellent conditions. All are prosperous and have orders and inquiries to indicate a season of much activity.

The Wright & Colton Wire Cloth Company are adding two new departments to their plant at Palmer, Mass. The company have secured a number of Fourdrinier looms for the weaving of Fourdrinier brass wire cloth for use in paper machinery. The Wright & Colton Company, who build a good deal of their own machinery, will build a number of additional looms, and will make this department a feature of the business. Another new department, the nature of which is kept a secret for the present, will be added at Palmer, and a new building, small and of special construction, has been erected to accommodate the machinery. The new departments would have been located at the main plant of the company at Worcester had there been room for them on the ground floor, the heavy machinery requiring that location.

The Morgan Construction Company have equipped a traveling machine shop, which they will use hereafter in filling contracts for wire and merchant mills. A large freight car of heavy construction was secured, and in it are installed a small boiler and engine, engine lathe, shaper and upright drill. Hitherto the company have had either to erect a temporary machine shop or else hire machine shop privileges, both of which were expensive compared with what the portable shop is expected to cost. The shop's first work will be on a Chicago contract.

The United States Envelope Company have acquired the business of the Munn Envelope Company of New York City, and will abandon the plant. The Munn Company hold the patents on envelopes containing a wire in two of the folds to enable a quick and clean opening of the envelope. This patent, as well as all others held by the company, goes to the United States Envelope Company, known as the trust. The machinery of the Munn factory will be sold with the exception of the envelope machines themselves, which will be transferred to the company's other factories, most of them coming to the three big Worcester factories. It is the intention of the United States Envelope Company to abandon the manufacture of the wire opening envelope.

Isaac L. Rheutan, superintendent of the Wade H. Hill Envelope Company division of the United States Envelope Company, has resigned to be manager of a new envelope company, to be established at Richmond, Va. It is understood that the new company are in the market for envelope and other machinery.

The Kilbourne Company of Fairhaven, Mass., manufacturers of wire specialties, are moving their business to Troy, N. Y., and Albert H. Dean of Worcester, formerly with the Wire Goods Company, Morgan Spring Company and Washburn & Moen department, has accepted the position of manager. The Troy plant will be twice the size of the present shops and twice the present working force will be employed.

The National Mfg. Company, manufacturers of wire goods and specialties, are building a large railing shed at their plant on Union street. The building will be of brick, 120 x 27 feet, and two stories in hight. The business of the company has grown rapidly of late, making necessary this considerable enlargement.

The Core Makers' Union is now stirred up over the refusal of the Rice, Barton & Fales Machine & Iron Company to grant a union demand of 25 cents a day increase in wages. The other union foundries of the city granted the increase without much demur. As a result of the action of the Rice, Barton & Fales Company four core makers went out. The company have before shown themselves able to cope with the unions, as was demonstrated when the molders struck several years ago. The company won a signal victory at the time. It is not expected that the strike will extend to the molders, although the situation is being watched with interest. The Rice, Barton & Fales Company are large manufacturers of paper machinery. To-day it was stated that the company will deal with the strikers individually, but not as a union.

The Worcester Emery Wheel Company is the name of a new company now establishing a plant on Exchange street. Joseph H. Dawson is the leading spirit in the business, and associated with him are several former employees of the Norton Emery Wheel Company.

The Worcester manufacturers are beginning to feel worried over the coal outlook. The large concerns, like the Washburn & Moen department, Crompton & Knowles Loom Works, Graton & Knight Mfg. Company and Consolidated Street Railway Company, are well enough supplied, for they have been able to stock up in anticipation of a scarcity of soft coal. But the smaller concerns are dependent upon the local coal dealers, who are themselves worried because of the apparently short supply of bituminous coal brought about by the anthracite famine. Coal prices are very high here. Soft coal is quoted at $5.50 and $6 at the docks at Providence and Boston, and it costs at least 50 cents more to haul to Worcester. So the coal bill of the manufacturer has gone up some 100 per cent. However, the chief worry is that coal might not be available at any price. Manufacturers are so very busy that they cannot afford to let up even for a day or two. Some of them are making arrangements to burn wood if necessary. Coke is out of the question for there has been hardly a ton of it in the city for weeks, and it is gobbled greedily by the bakers and foundrymen whenever a carload makes its appearance. As for the hard coal situation, the dealers have only a few tons left and there are sure to be empty bins before the mines can furnish a new supply even were the strike to break to-day.

The Worcester boiler manufacturers are exceedingly busy. The Stewart Boiler Works never had so much business on hand. More than 40 boilers, most of them large ones, are either building or ready for shipment.

Among the orders are three of 150 nominal horse-power, which will be run at 250 horse-power as an addition to a big battery of boilers at the North Works of the Washburn & Moen department. There are already 14 boilers in the battery, and with the additional boilers now building the aggregate horse-power will be more than 4000. The stack of this boiler house is a comparatively new one. It has an inside diameter of 9 feet and a hight of 180 feet. Two boilers of 200 horse-power each have been shipped by the Stewart Works to the new plant of the Crompton & Knowles Loom Works, now building at Germantown Junction, Philadelphia. Three boilers of 100 horse-power each are for the new foundry of the Brown & Sharpe Company at Providence, R. I. Two of 150 horse-power each are for the Washburn Wire Company plant at 118th street and Harlem River, New York. One large order is of nine boilers of 150 horse-power each for the power station of the Elizabeth, Plainfield & Central Jersey Street Railway Company. These boilers will be run at 175 pounds pressure and will each develop 250 horse-power. The Gaffney Mfg. Company of Gaffney, S. C., take one 200 horse-power upright of the Corliss type, and the Cannon Mfg. Company of North Carolina take two of the same size and type. The Stewart Works are also putting in two boilers for the Hartford County buildings at Hartford, Conn., and a 12-ton Scotch boiler for the Boston Store at Providence, R. I.

The Norton Grinding Company are now occupying their new shops at Barbers Crossing and have consequently been able to greatly increase their output. Orders for the big grinding machines are coming in from machine shops all over the United States, and not a few of the machines have been shipped across the water of late.

The new Morgan Motor Company are just completing several 10-ton steam trucks for heavy trucking in large cities and numerous inquiries are received to indicate that as soon as the big machines have been subjected to a sufficient test and have demonstrated their practicability there will be ready sale for them. The 3-ton trucks of the same type already built and in operation have proved themselves to be absolutely reliable for their purpose, and have even made long distance records by transporting heavy loads from Boston to Worcester, a distance of 44 miles, in between four and five hours.

The Washburn & Moen department of the American Steel & Wire Company has started a new system for the surgical care of men injured in the works. A well-known Worcester surgeon has entered into contract with the department to care for all employees who may need such attention. The department has its own ambulances, and when the case is serious the victim is hurried to the city hospital, where he is treated free of charge. But most accidents are not serious enough to warrant admittance to the hospital, and such cases will come under the immediate attention of the contract surgeon. He will also look after accident patients during the period of convalescence after they have been discharged from the hospital. The department has always been liberal in its relations to injured employees, most surgeons' bills being paid by the company, and it is believed that under the new system there will be a material financial saving, as well as assurance that the employees will receive the very best of skilled attention, which has not always been the case, as in not a few instances accident victims have fallen under the care of ignorant and unskillful surgeons.

The Consolidated Street Railway Company are about to place orders for the structural material for an addition to one of their car barns, which means a large amount of structural steel as well as much special track work.

The Hough Porch Shade Company have voted to remove their factory from Worcester to Janesville, Wis. A tract of land containing 25,000 square feet has been secured in that town and upon it a one-story factory building 50 x 340 feet will be erected. The company will be in the market for considerable wood working machinery. It is a new company, most of the capital being furnished by Worcester men.

The new Coes Wrench Company report that there never was such a demand for the company's monkey wrenches as at the present time. Increased orders are received from all over the world.

Harvard University has withdrawn its contract, held by the Norcross Bros. Company of Worcester, for the proposed $200,000 addition to Austin Hall, the home of the Law School.

It is practically settled that the $800,000 plant of the United Shoe Machinery Company will go to Beverly, Mass. Scores of cities and towns of the East were bidders, but as Beverly is the home of the president and two other directors of the company, every other place has given up all hope. The business men of Beverly have taken steps toward offering handsome inducements to locate there.

O. W. Norcross of Worcester, of the Norcross Bros. Company, is the president of a new Massachusetts corporation, the Massachusetts Contracting Company, whose capital stock is $12,000. A. J. Park is the treasurer and William J. Denholm the third director of the corporation, the directory being identical with that of the Norcross Bros. Company.

The Worcester & Connecticut Eastern Street Railway Company are to build a large repair shop at Putnam, Conn. The shop will be 30 x 100 feet, two stories high. The shop will be equipped with a 36-inch engine lathe, a number of smaller lathes, drills and drill presses, a wheel press and wheel grinder. The second floor of the building will be devoted to armature work.

Large shipments of foreign steel are arriving in Worcester, including a good deal of structural steel from Belgium, the Eastern Bridge & Structural Company having received 200 tons in one lot. The independent wire companies continue to receive large quantities of wire rods from England, Sweden and Germany. This has been necessary in some instances, while in others lower prices are claimed than those quoted by American manufacturers.

Heavy Contracts for Lake Vessels.

Last week the American Shipbuilding Company of Cleveland closed contracts for seven new steel steamers and in consequence the shipbuilding record of the Great Lakes will be broken during the season of 1902-3. This makes 34 vessels under contract by the Cleveland concern, not including two large side wheel passenger steamers which will be built for the Detroit & Cleveland Navigation Company. With the exception of a new car ferry the vessels are freight carriers and the combined carrying capacity of the vessels under contract will be 157,950 tons per trip. The total cost will be $8,357,000.

An order for one steamer was placed by the Eldorado Steamship Company of Buffalo. The boat will be a duplicate of the "W. C. Richardson," built last year. She will be 374 feet over all, 354 feet keel, 48 feet beam and 28 feet deep. She will have triple expansion engines, cylinders 20, 33½ and 55 inches with 40-inch stroke, to be allowed 170 pounds working pressure. The boat will be built at South Chicago and will cost $250,000.

The order for the six other boats mentioned constitutes one of the largest single contracts ever placed on the Great Lakes. By the purchase of these boats J. G. Gilchrist of Cleveland becomes the largest vessel owner on the lakes next to the United States Steel Corporation. They give him a total of 77 vessels, with a moving capacity of 5,000,000 tons of freight. In the construction of the Gilchrist steamers about 18,000 tons of material will be used. Owing to the slowness of delivery of American mills, it is quite probable that some of this large order will be placed abroad. The American Shipbuilding Company were forced a short time ago to purchase angles in Scotland.

The new Gilchrist boats will be 436 feet over all, 416 feet keel, 50 feet beam and 28 feet deep. They will have triple expansion engines 22, 35 and 58 inches with 40-inch stroke. They will have two Scotch boilers 13 feet 2 inches in diameter and 11½ feet long, to be allowed 170 pounds working pressure. The boilers will

be fitted with Ellis & Eaves induced draft. Each boat will carry about 6200 tons of ore on 18 feet of water. They will be fitted with all modern appliances for the rapid handling of ore and will be up to date in every respect. They will cost about $1,650,000.

MANUFACTURING.

Iron and Steel.

The six-mill sheet plant of the Laughlin Nail Company, at Martin's Ferry, Ohio, is being operated to full capacity. In one day recently their bar mill turned out 75 tons, the largest day's output in the history of the plant.

A number of improvements are being made at the Struthers works of the American Sheet Steel Company, at Struthers, Ohio.

Information is received from Delray, Mich., that Pittsburgh capitalists contemplate erecting a large steel plant in the vicinity of Delray, on the river Rouge.

The Republic Iron & Steel Company report that extensive improvements will be made on the Williams guide mill at the Brown-Bonnell plant, Youngstown, Ohio. The plant was shut down Saturday night. Two modern continuous furnaces and roughing rolls, which are being manufactured by the Morgan Construction Company of Worcester, Mass., will be installed.

The Wayne Iron Company, Limited, have recently filed articles of association at Detroit, Mich., with a capital stock of $300,000. The following are the principal stockholders: Joseph H. Berry, Wm. G. Sharp, Solon Burt, Wm. G. Smith, Lee Burt and John Christian. The company are to manufacture and sell iron, charcoal, wood alcohol, acetate of lime, &c. This is the company who will operate the Detroit furnace to which reference was recently made.

J. H. Williams of the Middleport Boiler Works, who has one of the contracts for the equipment of the plant of the Norwalk Iron & Steel Company, Norwalk, Ohio, has recently made arrangements with the Fort Pitt Bridge Company to erect the stacks at the Norwalk plant.

The Columbia Bridge Company, Pittsburgh Shafting Department, Park Building, Pittsburgh, are in position to supply promptly all sizes of shafting from ¼ inch to 2½ inches in diameter. This concern have specifications at steel mills for a full line of bars for all sizes of shafting from ¼ inch up to 6 inches, on which they are getting liberal shipments of sizes up to 2½ inches and are promised early shipments of the larger sizes. They solicit inquiries of the trade for the above products.

The Jones & Laughlin Steel Company, operating the American Iron & Steel Works, at Pittsburgh, are steadily increasing their output of steel. They have just arranged to add a third 10-ton converter in their Bessemer plant, which will give them a total of three and will increase their capacity for making Bessemer steel about 50 per cent. At present the Bessemer plant of this company turns out about 1600 tons, but this will be increased to 2400 tons. The Talbot Furnace, recently completed, is now working, but has not yet gotten up to its maximum output, which is expected to be 400 tons a day. Within a short time the Jones & Laughlin Steel Company expect to turn out about 100,000 tons of steel a month. A 40-inch blooming mill is being added and the increased steel capacity is necessary to take care of the additional rolling capacity.

The plant of the Portland Iron & Steel Company, Portland, Maine, recently partially destroyed by fire, will be rebuilt at once. The machine shop, shears and scrap shop were saved. Plans are being prepared for a new building to be used as a rolling mill, and the erection and equipment of this will be pushed forward as rapidly as possible.

The Standard Steel Works, Philadelphia, Pa., have awarded the contract for the erection of a one-story hammer shop, 67 x 600 feet, at their works at Burnham. The machinery has been arranged for.

The contractors for the buildings of the plant of the Marietta Sheet & Tin Plate Company, Marietta, Ohio, have finished their part of the work and turned the buildings over to the company. The foundations for the hot mill, engine and roll train have also been completed and the installation of the plant will now go rapidly on. There will be four 150 horse-power Erie boilers, a 36 x 72 hot mill engine and a cold mill engine. As noted in these columns some time ago, the equipment will consist of four hot and four cold mills and six shears, and the product will be sheet steel and tin plate.

The Carnegie Steel Company are installing in the merchant bar mill of their Duquesne Steel Works plant a large double rod reel. The merchant bar mill at this plant rolls rounds down to the size of wire rods, and when these rod reels have been installed can turn out wire rods should there be a falling off in demand for merchant bars.

After an idleness of nearly two months, during which time extensive improvements were made, including the addition of several new puddling furnaces and new foundations for some of the mills, the East Side mills of the Republic Iron & Steel Company at Toledo, Ohio, have been put in operation.

J. Jones Hudson has succeeded in forming the United States Charcoal Iron Company, with offices in Philadelphia, Pa. A large number of capitalists are interested, and the following officers have been elected: President and general manager, J. Jones Hudson; secretary and treasurer, Percy A. Marvel; attorney, John O. Wilson, Camden, N. J. A temporary lease has been taken on a property in Spring City, Chester County, Pa., until a more suitable site can be secured.

The difficulty in getting structural material has delayed the beginning of operations in the erection of the Keystone Drop Forge Works, at Chester, Pa., likewise on the new forge works of the Tindel-Morris Company of Eddystone. The latter firm will erect a temporary wooden building until they can procure necessary steel structural material. The forge building proper will be 58 x 113 feet in size.

As the result of the abandonment of the Irondale, Ohio, tin plate mills of the American Tin Plate Company some months ago, it is stated that that city is soon to have a new two-mill tin plate plant. The withdrawal of the first mentioned concern has so affected the business of the town that the leading merchants have subscribed to a new company, to be known as the Irondale Tin & Sheet Mill. The company will shortly be incorporated, and will locate in the old Furnace Hall plant, which includes 80 acres of land and a large building.

The Jones & Laughlin Steel Company have recently bought a good deal of ground adjacent to their American Iron & Steel Works on the South Side, Pittsburgh. This ground will be used in making extensions to their works which are now under way.

The Pittsburgh Works of the American Tin Plate Company at New Kensington, Pa., have been shut down for an indefinite period.

General Machinery.

The Syracuse Railroad Construction Company, who are building a 25-mile electric railroad between Auburn and Syracuse, N. Y., have recently closed a contract with the Westinghouse Electric & Mfg. Company of Pittsburgh, for two 650-kw. engine-type alternators, delivering three-phase current at 360 volts and 3000 alternators; also for five 400-kw. rotary converters, together with raising and lowering transformers for operating a 15,000-volt transmission line to two substations. A complete switchboard is included, and in fact everything for the operation of a complete railway line. The generators are to be direct connected to two 22 and 44 x 48 inch cross compound, horizontal, Corliss engines, purchased from Westinghouse, Church, Kerr & Co., and built by the Westinghouse Machine Company of Pittsburgh. The engines are to receive steam at 150 pounds, are to run at 100 r.p.m., and are rated at 1000 horse-power each, with a maximum rating of 1800 horse-power.

The Monitor Drill Company, Minneapolis, have been incorporated with a capital stock of $1,000,000. The new company evolve from the Monitor Mfg. Company, which have been reorganized under the new name. The capital stock of the Monitor Mfg. Company was $200,000, the increase being $800,000 for the new company. The old plant will be enlarged. The controlling interest of the Monitor Drill Company is held by the principal stockholders of the old Monitor Company. The officers are as follows: S. E. Davis, president, treasurer and general manager; E. R. Beeman, vice-president; H. G. Freeman, secretary. The other directors are J. H. Perry, Perry Harrison, Wm. Laidlaw and A. J. Rich.

The Haeks Drill Sharpener Mfg. Company, Deadwood, S. D., have been incorporated with a capital stock of $250,000. The incorporators are L. E. Phillips, James P. Hymer, Chambers Kellar.

Schumacher & Boye, Cincinnati, Ohio, owing to the increased demand for the "S. & B." engine lathes, of which they make a specialty, have been compelled to make some changes and additions to their already extensive plant at the intersection of Queen City avenue and Buck street by erecting an additional gallery in the main shop, 40 x 350 feet, and other additions in the way of buildings are contemplated in the near future. About $20,000 worth of additional new machinery has also been installed, among the more prominent of which are a Brown & Sharpe largest size grinder, Becker-Brainerd upright miller, a 60 x 60 x 24 Cincinnati planer, a 36-inch engine lathe, a 30-inch engine lathe, 18 x 8 friction head lathe, 18 x 10 quick change gear lathe, three Dresses Machine Tool Company's largest size radial drills, and one Cincinnati Machine Tool Company's upright drill with tapping attachment, also an additional 10-ton traveling crane, which will provide a much needed increase in capacity and for a time at least enable the company to keep up with their orders.

The Osborne & Stephenson Mfg. Company, Plainville, Conn., makers of metal novelties, advise us that the increasing demand for their work has induced them to enlarge their plant, and they have built a new factory, 40 x 75 feet, two stories, fitted with steam power, steam heat and electric lights. They will put in new tools suited to their line of work, which they have been engaged in for the last eight years, and are prepared to give estimates on turret lathe specialties, press work, dies, punches, small hardware and electrical parts.

Considerable new machinery and power equipment will be required by the New York Butchers' Dressed Meat Company,

510-512 West Forty-second street, New York, for their new abattoir. They advise us that no purchases have as yet been made.

The American Blower Company, Detroit, Mich., have completed plans and are receiving bids for the construction of a new machine shop, 50 x 60 feet, and a third story on a portion of the plant, measuring 35 x 150 feet. These enlargements are a part of the general scheme of improvements to their plant which have been under way for more than a year and which will continue at least throughout the balance of this year.

The Wright Taper Rolling Bearing Company, Buffalo, N. Y., will soon break ground for their new plant at Main street and Erie tracks. The plans call for a three-story building 44 x 216 feet, and two Ls, 40 x 75 feet and 40 x 65 feet respectively, one story high. The power plant to be installed will approximate 225 horse-power. The officers are Lewis J. Bennett, president; James P. Wood, vice-president; Albert G. Thorne, secretary, and Eugene A. Georger, treasurer.

The Keystone Mfg. Company, Buffalo, N. Y., manufacturers of tools, have plans prepared for a new plant of brick and steel, 80 x 140 feet, which will give them three times their present capacity. The building will be located on Chandler street and will be operated by electric power from Niagara Falls, the only fire in the shops being in the blacksmiths' forges. The present equipment will be augmented by the addition of about $10,000 worth of new machinery, which with the cost of the new structures will cause an outlay of $25,000.

The Diamond Machine Company of Providence, R. I., are making a special locomotive guide bar grinder which is being adopted by many of the locomotive builders and by railroads in their repair shops. They are also manufacturing some heavy machines for special knife and surface grinding. They will be glad to send catalogues and information on polishing or grinding machinery.

The Wray-Austin Machinery Company, Detroit, Mich., contractors for complete power plants, put their new wood pulley factory, 45 x 160 feet, into operation September 11.

Hugo Bilgram, Twelfth and Noble streets, Philadelphia, Pa., engineer and machinist, is having plans prepared for a new building, to be erected at 1221-1233 Spring Garden street. It will be 100 x 120 feet, four stories, of brick and slow burning construction.

The Pittsburgh Tool & Drop Forging Company, recently organized in Pittsburgh with a capital of $100,000, have commenced work on a new plant at Cheswick, on the West Penn Railroad. They will manufacture track and mining tools and specialties in forgings and tools of various kinds. A large part of the product will be made under patents owned by the company. The officers are: W. F. Schlifer, president; W. R. Wray, treasurer, and Joseph R. Morris, general manager.

The Ohio Brass Company of Mansfield, Ohio, are having plans and specifications prepared for a new machine shop, to be 56 x 336 feet and two stories high. Upon its completion their present machine shop will be utilized as a wareroom. They are also building a large new warehouse and a new insulation building.

The Champion Iron Works Company of Kenton, Ohio, whose plant was destroyed by fire some weeks ago, have purchased a site at the junction of the Big Four and Erie railways in Kenton, and will erect a large plant at once. Recently the city of Kenton sold $50,000 in bonds to retain the location of the plant.

The McMyler Mfg. Company of Cleveland are completing their large new plant at Warren, Ohio, and are removing much of their machinery from their Cleveland plant. They are planning to erect a new foundry as an addition to the Warren plant. A large force is already at work in their new pattern shop at Warren, and as soon as possible the new shop will commence work on several large orders for their hoisting and conveying machinery.

The firm of Force & Briggs, at Pittsburgh, dealers in second-hand machinery, have been dissolved, and hereafter will be known as the Briggs Machinery Company, John W. Briggs having purchased the interest of Frederick J. Force. The Briggs Machinery Company will make a specialty of handling wood working machinery and gas engines.

The Pennsylvania Engineering Works, New Castle, Pa., builders of blast furnace and steel plant construction, general machinery and plate work and iron and steel cars, have started work on a large new boiler shop.

The Weinman Machine Company of Columbus, Ohio, have opened proposals for the erection of their new plant, but they were dissatisfied with the bids, and the work will probably be refigured.

Boilers, Engines, &c.

Plans for three new pumping stations, which will increase the water supply of Brooklyn, N. Y., by from 10,000,000 to 12,000,000 gallons a day, are being prepared by the engineers of the Water Department in that borough. The construction of the new pumping stations was recently authorized by the Board of Aldermen. The stations, which are to cost together about $154,000, will be built at points between the Massapequa Pond and Milburn Reservoir, in Nassau County.

Director of Public Works Haddock, Philadelphia, Pa., has awarded the contract for the construction of the Ladner's Point Pumping Station to George C. Dietrich of that city, the lowest bidder. His bid was $561,452.50. The contract for supplying a 20-inch main on Water street, connecting with the 12-inch fire main on Race street, the 12-inch fire main on Arch street and the 16-inch main on Market street, was awarded to the Hoffman Engineering Company, Philadelphia, whose bid was $35,000.

Henderson & Co., Philadelphia, who were the lowest bidders for the pumping station at Delaware avenue and Race street, Philadelphia, Pa., for the new high pressure fire main system, have been awarded the contract for $56,533. The plant will be equipped with gas engines, which will be contracted for at an early date.

The Cape May Light & Power Company, Cape May, N. J., have started the erection of their new power house, 66 x 150 feet, which will be equipped with 1600 horse-power engines direct connected to Warren generators, furnished by the Rumsey Electric Mfg. Company of Philadelphia. The E. Keeler Company, Williamsport, Pa., have the contract for the boilers, and the Russell Engine Company, Massillon, Ohio, the contract for the engines.

The Washington Electric Railway Company, Washington, D. C., will build an addition, 30 x 250 feet, to their power house. New equipment will be installed, contracts for which have been closed.

H. E. Ford of Lorain, Ohio, will prepare plans and specifications for the new water works pumping station to be erected at Elyria, Ohio. The building will be 170 x 150 feet, and will contain two pumps, two boilers and six filters, with room for additional engines and boilers.

The Southern Engine & Boiler Works, Jackson, Tenn., are putting in a 250 horse-power twin engine at a point in Southern Georgia; have contracts for two Corliss engines, one 150 and the other 200 horse-power, for North Carolina; are installing a 125 horse-power engine and a 150 horse-power high pressure boiler at the Broseus No Treadle Sewing Machine Works, Jackson, Tenn., and also a small engine to run their dynamo. They are erecting a large saw mill outfit at Woodville, Fla., and also shipping a similar outfit to Southern Mississippi, and have contracts booked for parties in Arkansas, Texas, California and other Western States.

H. B. McNulty, secretary of the Chambersburg, Greencastle & Waynesboro Electric Street Railway Company, Chambersburg, Pa., advises us that no contracts have as yet been let for the equipment of their new 2000 horse-power plant to be erected at Chambersburg. The chances are, however, that the Tennis Construction Company, Stephen Girard Building, Philadelphia, will receive the contract. The company purpose to build a line from Chambersburg to Greencastle, Waynesboro and Pen Mar, a distance of 28 miles. C. H. Lattse is president.

Among the August sales of the Allis-Chalmers Company, Chicago, we are informed of the following: Carnegie Steel Company, Pittsburgh, Pa., repairs for 42 inch and 60 x 60 inch blowing engine; Pawling & Harnischfeger, Milwaukee, 18 x 36 inch 1890 frame Reynolds-Corliss engine; Interurban Construction Company, Ottumwa, Iowa, 18 x 42 inch 1890 Reynolds-Corliss engine; Sloss-Sheffield Steel & Iron Company, Birmingham, Ala., three vertical standard long cross head 44 inch and 84 x 60 inch blowing engines; National Lead Company, New York City, 18 inch and 32 x 36 inch 1890 tandem compound Reynolds-Corliss engine; Oregon Smelting & Refining Company, Sumpter, Ore., 16 x 36 inch girder frame Reynolds-Corliss engine; Iroquois Iron Company, Chicago, 42 inch and 87 x 60 inch vertical long cross head blowing engine; Shattuck Brothers, Sparta, Wis., 8 x 24 inch girder Reynolds-Corliss engine; Denver Tramway Power Company, Denver, Col., 32 inch and 68 x 60 inch 1890 cross compound condensing Reynolds-Corliss engine and 30 inch and 64 x 48 inch 1890 cross compound condensing Reynolds-Corliss engine; Detroit Copper & Brass Rolling Mills, Detroit, Mich., 26 x 48 inch 1890 Reynolds-Corliss engine, and Southern Electric Light & Power Company, Philadelphia, Pa., 42 inch and 86 x 60 inch combined vertical and horizontal duplex compound condensing Reynolds-Corliss engine.

Moore & McCrary, engineers, English-American Building, Atlanta, Ga., will shortly let contracts for constructing water works and electric light plant at McRae, to cost $18,000.

The Allegheny Steel & Iron Company of Pittsburgh, with sheet mills at Tarentum, Pa., have bought from Wickes Brothers of Pittsburgh a vertical water tube boiler of 350 horse-power.

The Lorain Heating & Mfg. Company of Lorain, Ohio, have been incorporated with $10,000 capital stock by A. H. Babcock, C. E. Krantz, F. C. Whitmore, J. S. Mead and S. W. Vaugh. They will erect a factory at Lorain.

The City Clerk of Cleveland has called for bids on six water tube boilers equipped with superheaters, chain grate mechanical stokers, brick work and other appurtenances, in accordance

with specifications that may be obtained from the Superintendent of Water Works.

The water works trustees of Fremont, Ohio, will shortly call for proposals for the furnishing of a new boiler, air compressor and other appliances necessary for pumping the deep water wells in connection with the water works plant.

Citizens of Galion, Ohio, have voted favorably on a proposition to erect a municipal water works plant, and work on a $50,000 system will commence as soon as plans can be prepared and bids received. At present the city water is furnished by a private corporation.

The Westerfield Motor Company, Anderson, Ind., formerly composed of W. C. Vanneman and G. G. Westerfield, the inventor of the motor, have taken in an additional member, A. H. Sears, and have incorporated with a capital stock of $150,000 for the purpose of increasing their facilities for the manufacture of gasoline motors for automobiles, mufflers, oil valves, &c. They have secured a building and are at present installing additional machinery to take care of their orders, which they have been unable to do heretofore.

The Board of Public Works, Mt. Clemens, Mich., have recommended the purchase of a 3,000,000-gallon pumping engine for the water works. Bids will be received October 17 for both a compound and triple expansion outside packed condensing engine. Henry C. Benton, city clerk.

Foundries.

The Zanesville Malleable Iron Company, Zanesville, Ohio, will have their new plant in operation by October 1, with a capacity for 5000 tons of castings per annum, producing all classes of malleable work from light to heavy.

The Calcasieu Iron Works & Mill Supply Company, Limited, Lake Charles, La., have been incorporated with a capital stock of $20,000 to manufacture boilers, foundry work and general mill supplies. A. McKinnon is prominent among the incorporators of the company.

The shop in which the brass molding and small work was done was the only department damaged by the recent fire at the plant of the Lorain Foundry Company, Lorain, Ohio. The core room, engine room, cupolas and pattern shop were uninjured. Manager Phelps announces that a large force has been placed at work, and that temporary structures will be erected so that trade can be taken care of with as little delay as possible.

The Eynon-Evans Mfg. Company, Philadelphia, Pa., advise us that they have not yet taken up the matter of equipment for their new building, but will require some cranes, trolley tracks, &c., when they do so. It will be an addition to the foundry, and will embody a melting room for 20 furnaces, one-story, 20 x 80 feet, and a two-story part, 20 x 60 feet, with cellar for sand storage. The ground floor will be used for metal storage and the second for employees' washroom. In connection with this work they are also building a new core room, with second story for storage of core boxes, &c. These changes will enable the company to greatly increase the molding capacity of the present foundry, removing from it the furnaces and core making department.

The Richard Mfg. Company, Bloomsburg, Pa., will erect a new foundry, 40 x 150 feet.

The Woonsocket Machine & Press Company, Woonsocket, R. I., are building an addition to their foundry.

The Seaboard Steel Casting Company of Chester, Pa., are having installed another 350 horse-power engine. The new engine will be of the Ames pattern from Oswego, N. Y., and will be a duplicate of the larger of the two engines now in operation at the works.

The Interstate Foundry Company of Cleveland have completed the structural work for and will shortly occupy their new foundry designed for heavy castings. The structure is a large one, 140 x 300 feet. It is equipped with one 40-ton, one 25-ton and four 5-ton electric traveling cranes, with an extension runway enabling them to run out of the building at either end for loading and unloading purposes. They are also erecting an addition to their light castings department, 140 x 200 feet, so that it will soon be possible for them to take care of orders for castings of any kind from 1 ounce up to 70 tons.

The Johnson & Jennings Company of Cleveland are moving into their new foundry plant, which is one of the finest in the country. It is located on a 5-acre tract of land facing the Lake Shore & Michigan Southern and a spur line of the Pennsylvania Railway. There are seven new structures practically completed. The foundry building proper is 110 x 300 feet; the pattern shop 37 x 50 feet, two stories; the power house 39 x 83 feet, and the office building 50 x 75 feet. The foundry is absolutely fire proof, of brick and steel, with slate roof, and there are two 84-inch cupolas. The plant is to be driven by compressed air and electricity. It is equipped with electric traveling cranes, jib cranes, pneumatic clippers and all the modern appliances known to the foundry business. Castings up to 50 tons will be produced. It is claimed the new plant is one of the largest and best equipped in the country.

The Thomas Mfg. Company of Springfield, Ohio, have purchased a site and will erect an addition to their plant in the shape of a new foundry.

The Shirley Radiator & Foundry Company, Shirley, Ind., have incorporated with a capital stock of $50,000, for the manufacture of steam and hot water radiators and to do a general foundry business. They have a building, 75 x 250 feet, under construction and will erect another foundry the same size, making when completed a plant 75 x 500 feet. The plant is located in close proximity to the crossing of the Peoria & Eastern and the Cincinnati, Wabash & Michigan railroads, giving excellent shipping facilities to all parts of the country. The officers are: Robert Martindale, president and treasurer; Thomas J. Markey, vice-president and general manager, and W. W. Knight, secretary.

Bridges and Buildings.

The County Commissioners of Stark County, Ohio, headquarters at Canton, have called for bids for furnishing and constructing a steel bridge, to have a span of 50 feet between abutments and 50 feet wide.

The Lake County Commissioners at Painesville, Ohio, have awarded a contract to the King Bridge Company, Cleveland, for a bridge over the Chagrin River at Willoughby. It will cost $9850. There were six bidders.

The Toledo office of the Massillon Bridge Company, Massillon, Ohio, have closed two good contracts recently. One is for repairs and an addition to the Eads Bridge across the Mississippi at St. Louis, involving an expenditure of $100,000, and the other is for new bridges for the Pennsylvania Railway, to cost $100,000.

The Scioto Valley Traction Company of Columbus, who are building two electric lines out of that city, are closing contracts for their entire equipment. Last week they placed an order with the Carnegie Company for 5500 tons of rails and with the Mt. Vernon Bridge Company, Mt. Vernon, Ohio, for ten steel bridges. The two contracts involve an outlay of about $225,000. Grading on both roads have been completed. They will be among the fastest electric lines in the country.

The Carolina Bridge & Steel Company of Burlington, N. C., have been incorporated with a capital stock of $250,000, of which $150,000 has been subscribed, half common and half preferred. The incorporators are F. J. Murdoch of Salisbury, E. P. Wharton of Greensboro and B. W. Curtis of Raleigh.

Fires.

The power house of the Victoria Coal & Coke Company of Catasauqua, Pa., at Caperton, W. Va., was destroyed by fire September 18. The loss will reach $25,000.

The galvanizing department and warehouse of the Harrisburg Pipe & Pipe Bending Company, Harrisburg, Pa., were destroyed by fire September 20, entailing a loss of about $25,000.

W. E. Burns & Brothers' carriage factory, at Havre de Grace, Md., was destroyed by fire September 16. The loss is about $30,000.

The frame foundry of the American Brake Shoe & Foundry Company, Chattanooga, Tenn., was destroyed by fire September 17, involving a loss of $5000, fully covered by insurance.

The stamp mill and cyanide plant of the Columbia Gold Mining Company, at York, Mont., was destroyed by fire last week. The loss is about $50,000.

Fire last week destroyed the barbed wire department of the Oliver plant of the American Steel & Wire Company, South Side, Pittsburgh, causing a loss of over $100,000.

Hardware.

The Ornamental Iron & Wire Works, Seattle, Wash., have been incorporated with a capital stock of $30,000. J. L. Waller and Z. B. Lawson, incorporators.

The London Fence Machine Company of London, Ontario, will open an American factory for the manufacture of their fence at Cleveland. They have secured a long time lease on a tract of land on Marquette street, that city, and will take steps at once to erect a factory. The fence concern have a large plant at London, and their aim in locating at Cleveland is to be nearer the source of material and to manufacture more economically, so as to compete in the American markets.

George Callahan & Co., 218 Front street, New York, have been supplying the United States Government with their rubber roof cement, used in connection with the fortifications on the New Jersey Coast, and refer to it as having given excellent results. They have now received large additional orders for the Sandy Hook, Willet's Point and West Point Government works, now in course of construction. This concern also manufacture a steam joint cement.

J. T. Slocomb & Co., manufacturers of micrometer calipers, combination center drills, &c., will soon remove their business from Eddy street, Providence, R. I., to a new building, which is in cource of erection for them on Oxford street, Providence. The new shop is 90 x 45 feet, with an L, 45 x 20 feet, and a power house, 45 x 45 feet. It is built of brick and is designed to be fire proof. For the present the structure will be carried up one story only, but is planned to add three more stories whenever desirable. A gas engine power plant has already been purchased, and practically all the equipment needed has been

ordered. They expect to occupy the new quarters during December.

The Bond Steel Post Company, Adrian, Mich., are adding a new building to the present box plant of the company. The new shop is to be of brick, 38 x 100 feet, and one-story high; the floor will be cement and roof gravel. The steel, which was ordered for this building last March, has just been received, together with several carloads of other material to be used in equipment. The company report the receipt of large orders from all over the country, largely from railway companies. They have also booked a contract for fence posts from Christiania, Norway. The increased business of the company makes it necessary to run a night shift.

Scheeler's Sons, manufacturers of wire cloth, artistic metal work and wire goods, Buffalo, N. Y., are now having plans drawn for a large addition to their factory. The building will be 50 feet wide by 100 feet long, and will have four stories and a basement.

Eureka Bark Mill Company, Lancaster, Pa., have been making quite a number of shipments of the Eureka bark mills to foreign countries. They also refer to their corn and cob mill business as good.

The L. & I. J. White Company, Buffalo, N. Y., manufacturers of edge tools, machine knives, &c., have considerably increased their manufacturing facilities, and have added to their plant a large storage shed for iron and steel. They have also made an addition to their office building.

During the summer Iver Johnson's Arms & Cycle Works, Fitchburg, Mass., have added a new hand milling department, and at the time of their shut down for stock taking and repairs they put in considerable new machinery in different departments. This was necessary in order to increase their output, the demand for goods exceeding their former capacity.

Indiana Edge Tool Company, Gas City, Ind., are running to full capacity on axes, hay knives, corn knives, grass hooks, &c. They report a very large run on corn knives during the season.

Davis-Hansen Company, manufacturers of pumps and cylinders, Oshkosh, Wis., have been making extensive improvements in their plant in the way of fire walls and new buildings, in compliance with insurance demands as a matter of safety, and to enable them to take care of their enlarging trade.

Arcade Mfg. Company, makers of coffee mills, toys, hardware specialties, &c., Freeport, Ill., have recently completed a large addition to their plant, in the shape of a substantial brick building, 50 x 100 feet, two stories high. This has been equipped with modern machinery and facilities, and will largely increase their capacity in toy goods. Last season they were seriously handicapped for want of room and were unable to fill some of their orders. With the above enlargement of their facilities, however, they will be in better position than ever before to supply the trade with these goods.

The N. B. Gaston's Sons Company, Beloit, Wis., advise us that during the past two years they have changed the construction of both their wagon dumping and wagon scales, and have made such improvements in them that they are now giving better satisfaction than ever before. This they realize from many complimentary letters received from their customers.

J. I. Case Threshing Machine Company, Racine, Wis., have completed plans for a new warehouse, to be erected at Des Moines, Iowa, during the autumn. The building will be 94 x 132 feet, three stories high. It will be of brick and steel, and will be equipped with electric elevators.

Ashland Emery & Corundum Company, Colonial Building, Boston, Mass., are enlarging their plant at Perth Amboy, N. J., in order to accommodate the work formerly carried on at the Walpole Emery Mills, South Walpole, Mass., and the Diamond Emery Mills at Philadelphia. In other words, they are consolidating three of their largest mills at Perth Amboy, and are making the necessary enlargements of the plant at that point, consistent with the large amount of work which will be carried to Perth Amboy by this arrangement; also putting in the most modern machinery for the proper manufacture of Turkish emery and corundum. They expect to more than treble the present size of their plant at Perth Amboy. The company are also entirely rebuilding their plant at Chester, Mass., and have just started one of the largest mills there on Canadian corundum, which they are importing from Canada in the form of ore and manufacturing into all grades of pure corundum. They find that it will be necessary to run their largest works night and day in order to supply the demand which has already arisen for these goods.

Baker Mfg. Company, Evansville, Wis., have done a large business this year in wind mills, pumps, tanks and feed grinders, their sales for the first eight months exceeding those of any previous entire year in their history. Just now they are increasing their capacity by the erection of an additional building, which will be 90 x 140 feet.

Wrought Washer Mfg. Company, Milwaukee, Wis., are installing some very heavy shearing machinery, and will add to boiler capacity in connection with their heating furnaces, as well as make other extensive improvements, which will enable them to handle orders more expeditiously and get out 25 per cent. more product. These improvements will provide them with one of the best equipped plants in the country in their line.

About a year ago Logan & Strobridge Iron Company, New Brighton, Pa., manufacturers of builders' and house furnishing hardware, iron castings, &c., doubled the capacity of their box shop in building and machinery. Since then they have added a number of new machines to facilitate the manufacture of their different lines.

During the past two years G. & H. Barnett Company, Black Diamond File Works, Philadelphia, have made a number of additions and improvements in their plant in the way of new machinery of various kinds in every single department, thus increasing their facilities very materially. They have also installed an entirely new boiler plant and house, doubling the capacity and supplanting the old equipment entirely; also an addition to their annealing department, making it more than double its former size. The company have plans in hand for a new steel warehouse, and have also acquired properties adjoining their plant to the extent of 25,500 square feet of ground for future extensions.

Cleveland Twist Drill Company, Cleveland, Ohio, besides adding new machines, either to displace old ones or to increase their facilities, are now building an addition to their factory, which will be 120 feet long, three stories high. This is being done for the purpose of rearranging the different departments to the best advantage.

The Caldwell Mfg. Company, Rochester, N. Y., makers of hardware specialties, have been steadily adding new and improved machinery, and refer to their sales this year as double those of 1901. They are now looking for a new site, as their business is outgrowing their present quarters.

Cattaraugus Cutlery Company, Little Valley, N. Y., during the year have largely increased their capacity. They have installed two electric lighting plants, and have added five large rooms to their shipping department and a large glass top etching room. The company have also purchased some adjacent property on which, in the near future, they will put in operation a large electric power building. They have had all the business they could handle, in fact more than they could comfortably take care of, and refer to the fall trade as opening up very nicely.

Clinton Wire Cloth Company, Clinton, Mass., have made additions to their plant for perforating metals to make room for some heavy presses required in the business.

The Kilbourne & Jacobs Mfg. Company, Columbus, Ohio, have just completed a new power plant. They have also replaced the several steam engines that drove their different departments with electric motors of improved type. The company have increased their facilities very materially for turning out steel mine and ore cars, steel skips and cars for industrial purposes, in addition to their regular line of steel scrapers, contractors' supplies, &c. They have within the year installed a great many modern machine tools and special tools to simplify and better their output, and have erected several new shop buildings, so that they are better able than ever before to handle the large increase in demand for special cars of all kinds made entirely of steel. These improvements when entirely completed will increase their capacity fully 50 per cent.

Miscellaneous.

The Phœnix Galvanizing & Mfg. Company, at Pittsburgh, have bought a site of land, 123 x 160 feet, formerly occupied by Kane-Maloney Iron & Steel Company, and will erect a galvanizing plant on it. The present works of the concern are on Duquesne Way, Pittsburgh, but these will be abandoned when the new plant is finished.

The Forsyth Pattern Company of Youngstown, Ohio, have a very large plant, the main building being 350 feet long and 56 feet wide, with finishing room 70 x 70 feet and boiler and engine room 30 x 50 feet. The plant is equipped with hot air system of heating and patent dust collector for taking shavings and dust from machinery on the main floor and conveying under boilers. The company at present employ 50 men, and are at present working on the pattern for a 10-ton converter, of which the hoistings are of triangular dimensions, 12 x 16 feet base; also set patterns, one 50, one 40 and one 30-ton electric cranes; one 64-inch bar shears; also one complete set of hydraulic fittings, 3 x 36 inches, composed of ells and tees, 70 pieces in all.

The Hussey Moore Implement Company of Dublin, Ind., it is reported, have decided to move to Knightstown, which is 20 miles west of their present location and within 34 miles of Indianapolis. According to information received, the Merchants' & Manufacturers' Association of Knightstown will build the plant, consisting of three brick buildings, each 50 x 175 feet, at a cost of $10,000, the property to be deeded to the implement company when they have distributed $100,000 in wages, not including the salaries of the officers and clerical force. The contract calls for the completion of the plant by December 1.

Bids are being received for the construction of an addition to the plant of the Chicago Malleable Iron Company, which was recently acquired by the International Harvester Company. The principal new building will be one story in hight, of brick construction, 150 x 250 feet. Plans are also being prepared for

three additional buildings to be erected at the Plano Mfg. Company by the International Harvester Company.

Plans for alterations and additional buildings at the plant of the Pullman Company at Pullman are being prepared by C. F. Jobson, it is reported, and the cost of the work is estimated at $81,000.

The Hickson Mfg. Company, Muncie, Ind., have been incorporated with a capital stock of $100,000, to manufacture iron and brass bedsteads. The plant, which is now in operation, has a capacity of from 500 to 1000 daily. The foundry and shops were formerly operated by the Bell Stove Works. The officers of the Hickson Mfg. Company are: E. G. Hickson, president; T. J. Parish, vice-president; C. H. Church, secretary and treasurer.

The Buckley-Hart Mfg. Company have filed articles of association at Detroit, Mich. The capital stock of the company is $40,000. The company will manufacture and sell brass, iron and other metal specialties. The incorporators are as follows: Jas. P. Buckley, Richard P. Joy, Robt. W. Hart, Henry P. Hart and S. A. King.

Articles of dissolution have been filed by the Crescent Brass & Iron Company, at Detroit, Mich.

The Lansing Wheelbarrow Company, Lansing, Mich., are having plans prepared for a large addition to their plant. The new building will be devoted to the manufacture of steel scrapers, and the estimated cost of the improvement is $40,000.

The Detroit Steel Cooperage Company have been organized and are now building a plant on Sylvester street and the Michigan Central Belt Line Railroad, Detroit, Mich. The building now in course of construction will be 100 x 225 feet and will be entirely of brick and steel, fully equipped with four traveling cranes, large furnaces for enameling and modern machine tools. The shop will be lighted by electricity. The cost of the building and equipment is estimated at $50,000. It is hoped to have the building ready for operation by January 1.

The Otis Elevator Company, New York, have closed contracts with the Hotel Imperial Annex for seven hydraulic and two electric elevators, and the Blair Building, Broad street and Exchange place, for six hydraulic elevators.

The Cohen Automatic Electric Block Signal Company have been organized in Pittsburgh and will apply for a charter. The new concern proposes to manufacture railroad signals under a new system, for which strong advantages are claimed.

The Enamel Steel Tile Company of Bellaire, Ohio, are nearing the completion of their plant. The factory and equipment will be modern in every detail, and the company state that a high class of enamel steel tile will be offered in a few weeks. This tile will be made in the various sizes, colors and designs, requires no repainting, and will not fade or craze. The officers of the company are as follows: J. F. Du Bois, president; W. H. Landkrohn, manager; J. W. Garber, secretary and treasurer.

Howard Abbott, Springfield, Ohio, announces that he and associates have organized an automobile manufacturing company which will be incorporated at $600,000; two-thirds already subscribed. A large factory is to be located at Springfield.

W. J. Faley of East Palestine, Ohio, and Ellis Roberts of the Roberts Machine Company of the same place, have secured the lease of the old lock works at Salem, Ohio, and they expect to secure the removal to that city of a plant for the manufacture of automobiles now located in the East.

The Susquehanna Silk Mills Company of Marion, Ohio, have placed contracts for engines, generators, motors, boilers, &c., for an electrical power plant to cost about $50,000. All machinery will be driven by electricity.

The Geneva Automobile & Mfg. Company of Geneva, Ohio, who heretofore have manufactured steam automobiles, are going into the manufacture of vehicles of the gasoline type and will improve their plant for this purpose.

The Standard Carbolite Lighting Company have bought about 100 acres near the village of La Salle, a suburb of Niagara Falls, and will there establish the gas generator factory and model town projected by the company. The generator to be made by the company is for acetylene gas. The town to be established will be lighted by this gas and will have its individual conveniences of every form, in order that it may be a model for other places to follow.

The recently organized New York Butchers' Dressed Meat Company, 510-512 West Forty-second street, New York, have purchased a site, 125 x 197 feet, on Eleventh avenue, between Thirty-ninth and Fortieth streets, upon which they will erect a six or seven story abattoir, which will be equipped throughout with all modern appliances and will cost when complete about $500,000. Within a few days the plans will be ready, and it is expected that the plant will be in operation by early spring. The officers are: Arthur Bloch, president; Meyer Mayers, vice-president; W. C. Wagner, secretary, and A. Buchsbaum, treasurer.

The Barnett Equipment Company of America, 39 Cortlandt Street, New York, and 20 Prospect street, Newark, N. J., have incorporated with a capital stock of $100,000 for the manufacture of an automatic device, under patents of Stephen D. Barnett, to supersede the safety chains on railway cars, which have heretofore been operated by hand. The officers are: Stephen D. Barnett, president; Edwin W. Hine, vice-president; Frederick W. Egner, secretary and treasurer: George L. Fowler, mechanical engineer; Benjamin W. Tucker, consulting engineer, and Riker & Riker, counsel.

The Depew Knitting Company are understood to be about ready to begin the construction of their plant at Depew, N. Y., which will consist of seven buildings and cost about $75,000. The company were formerly located at Troy, Pa., and will manufacture hosiery and all kinds of knit goods. Work is being carried on in temporary quarters adjoining the new factory site. Among the men interested in the company are Franklin S. Buell, C. H. Hammond, William B. Cutler, Frank S. McGraw, William Hengerer, Arthur D. Bissell of Buffalo, and W. S. Stead of Troy, Pa.

The J. G. Brill Company, Philadelphia, Pa., car and truck builders, have secured the plant of the American Car & Truck Company, at St. Louis, Mo., which they will operate in connection with their present plant.

The Blaisdell Screen Plate Company, Oakland, Maine, and Watertown, N. Y., will erect a plant at the former city for the manufacture in a small way of patent screwless screen plates for pulp and paper mills. Later they intend to take up the manufacture of paper and pulp machinery. J. H. Blaisdell is manager.

The Fox Furnace Company of Cleveland, manufacturers of furnaces, will enlarge their plant at Elyria, Ohio, and will engage in the manufacture of other lines of goods. The plant has been enlarged twice within a year and the new shops will double their capacity.

The General Automobile & Mfg. Company of Cleveland, who recently purchased the old plant of the O. P. Clay Stampings Company, have purchased land adjoining and will erect an additional building. They expect shortly to be in a position to turn out six or seven gasoline automobiles per day.

The Sorensen Mfg. Company of Ravenna, Ohio, manufacturers of X-ray machines, are completing a new factory building, 110 x 110 feet, and two stories high, which will be utilized wholly in the manufacture of X-ray machines. Later the company propose to go into the manufacture of electrical and surgical instruments. They are shipping X-ray machines to all parts of this country and Europe.

The Winton Motor Carriage Company of Cleveland have practically completed their plant at Lakewood, near Cleveland. It will be in full operation October 1, exactly four months from the time the first shovel was turned. There are three large buildings, a pattern shop, a machine shop and a foundry, embracing the largest automobile factory in the country. The change of factories has been made without the loss of time. The machines were moved one at a time and the workman employed on each machine moved with it, setting it up immediately in the new factory. Not until the old building has been deserted will the work there stop. The Winton Company will erect a large seven-story office building and salesroom in the business section of the city.

The Bessemer Coke Company, Lewis Block, Pittsburgh, have completed 400 new coke ovens at their Griffin plant in the Connellsville region, and will build 200 more ovens at their Geneva Works.

The National Brass & Iron Works, Reading, Pa., have voted to increase their capital stock from $200,000 to $550,000. They have absorbed the businesses of the Reading Gas & Electric Fixture Company and the Arrowsmith Electric Company, and are about to erect a four-story brick building, 30 x 70 feet, to make the proper facilities for conducting their increased business.

The Hale & Kilburn Mfg. Company, Philadelphia, Pa., are having plans prepared for a new plant. Engines and boilers will be required, the horse-power of which has not yet been determined.

The American Bridge Company will build, at their Economy Works, Pennsylvania, a fleet of steel barges to be used in handling freight to and from the plants of the United States Steel Corporation along the Monongahela and Allegheny rivers. Owing to congestion in the railroads it sometimes takes three days or longer to haul material from the Homestead Steel Works to the Keystone Bridge Works, and the object in building this fleet of barges is to save some of this time.

Conferences among the officials of railroad companies and owners of blast furnaces in the Pittsburgh district are being held on the serious problem of disposal of the furnace slag that has now become a drug on the market, even for filling of low ground or for railroad ballasting. The action of railroad companies in advancing the freight rates on this waste material recently has pressed this matter upon the furnacemen, because the removal of slag has been made a difficult task. A place to unload it, as well as the cost of removing it, has been added to the necessities of furnace owners.

The Iron and Metal Trades.

Reports have been circulated in Iron trade circles to the effect that the management of the United States Steel Corporation had decided upon a very important change in policy, that in the future the corporation will not sell its raw materials, Iron Ore and Coke, to outside interests. We have been unable to secure any official confirmation or denial of these reports, which, however, are brought forward with much show of authority. It is needless to say how far reaching the effects of such an attitude would be, particularly as to Ore. During the current season the corporation will ship about 2,000,000 tons of Mesaba and Old Range non-Bessemer Ores to outside parties. So far as Coke is concerned the majority of the blast furnaces in the Central West and in the East have been more or less dependent upon the Frick Coke Company for at least a share of their fuel supply.

If these reports should prove to be correct we might witness an unsettled condition bordering on chaos.

From a number of large consuming districts comes evidence of an extraordinary condition of the Coke supply. Founders have been forced to pay $10 and $12 per ton to keep their plants going.

The buying of foreign Pig Iron continues on a liberal scale. A leading Cast Iron Pipe interest have purchased a total of about 40,000 tons for delivery at Ohio and Kentucky points at prices varying from $19 to $20, duty paid. A considerable business has also been done in smaller lots. There is some business pending also in Low Phosphorus Pig.

In the aggregate pretty large quantities of foreign Steel have been placed and some round lots are being negotiated for. Among these is one lot of about 10,000 tons for a large concern which only recently purchased a like amount, of which some is to be shipped to Birmingham, Ala., and the balance to the Chicago and Indiana districts. The majority of the German makers now ask higher prices, encouraged by the business taken, not only in Billets but also for Rails.

The Canadian Pacific Railroad Company have allotted about 55,000 tons of Steel Rails, all of which, so far as can be learned, went to English and German makers; no part of the work coming to this country. On the other hand an American mill captured the 20,000-ton order of the Grand Trunk Railway.

From Cleveland comes the announcement that some very large orders for Plates and Structural Material have been placed, one of them for 13,000 tons. In the East, too, some round lots of Plates have been booked.

The lighter branches of the trade are still suffering because there has been increasing competition from new producers, while buyers maintain a cautious attitude, expecting further concessions. There has been some irregularity in the far West and Southwest in the Wire trade. Some sharp cuts in delivered prices have been made, which are, however, attributed to the rate war now in progress in that territory.

Bridge contracts, which are now being placed by railroad companies, are in some cases covering deliveries which will extend up to the middle of 1904. This is believed to be the first occasion in the history of this country when contracts for Structural Material have extended so far ahead. It would not be possible for contracts for Structural Material for any other purpose than for the use of a railroad company to be projected so far into the future.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one month and one year previous.

	Sep.24, 1902.	Sep.17, 1902.	Aug.27, 1902.	Sep.25, 1901.
PIG IRON:				
Foundry Pig No. 2, Standard, Philadelphia	*$22.00	*$22.00	*$22.00	$14.85
Foundry Pig No. 2, Southern, Cincinnati	***$22.25**	*21.75	*20.25	13.50
Foundry Pig No. 2, Local, Chicago	***23.00**	*23.00	*22.00	15.00
Bessemer Pig, Pittsburgh	*21.75	*21.75	*21.75	15.75
Gray Forge, Pittsburgh	*20.75	20.75	*20.75	13.75
Lake Superior Charcoal, Chicago	*26.00	*26.00	*26.00	17.00
BILLETS, RAILS, ETC.:				
Steel Billets, Pittsburgh	†29.00	†29.00	31.00	26.00
Steel Billets, Philadelphia	†27.00	†26.50	28.00	26.75
Steel Billets, Chicago	†29.50	†30.00	29.60	....
Wire Rods, Pittsburgh	35.50	36.00	36.00	35.50
Steel Rails, Heavy, Eastern Mill.	28.00	28.00	28.00	28.00
OLD MATERIAL:				
O. Steel Rails, Chicago	**19.00**	19.00	18.50	13.50
O. Steel Rails, Philadelphia	21.50	21.50	21.50	16.75
O. Iron Rails, Chicago	**25.00**	25.00	24.50	21.00
O. Iron Rails, Philadelphia	**25.00**	24.00	24.00	18.50
O. Car Wheels, Chicago	21.00	21.00	21.00	16.00
O. Car Wheels, Philadelphia	20.00	20.00	20.00	16.50
Heavy Steel Scrap, Chicago	**18.50**	18.50	18.00	13.00
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia.	1.92	1.92	1.92	1.62½
Common Iron Bars, Chicago	**1.85**	1.90	1.80	1.65
Common Iron Bars, Pittsburgh.	1.80	1.80	1.80	1.50
Steel Bars, Tidewater	2.00	2.00	2.00	1.65
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.50
Tank Plates, Tidewater	2.00	2.00	2.00	1.75
Tank Plates, Pittsburgh	1.75	1.75	1.75	1.60
Beams, Tidewater	Nom.	Nom.	2.25	1.75
Beams, Pittsburgh	Nom.	Nom.	2.00	1.60
Angles, Tidewater	Nom.	Nom.	2.25	1.75
Angles, Pittsburgh	Nom.	Nom.	2.00	1.60
Skelp, Grooved Iron, Pittsburgh.	2.02½	2.02½	2.12½	2.00
Skelp, Sheared Iron, Pittsburgh.	2.10	2.10	2.15	2.05
Sheets, No. 27, Pittsburgh	2.85	2.85	2.90	3.25
Barb Wire, f.o.b. Pittsburgh	2.85	2.90	2.90	2.95
Wire Nails, f.o.b. Pittsburgh	2.00	2.05	2.05	2.30
Cut Nails, Mill	2.05	2.05	2.05	2.05
METALS:				
Copper, New York	**11.60**	11.70	11.50	16.50
Spelter, St. Louis	**5.25**	5.15	5.20	3.95
Lead, New York	4.10	4.10	4.10	4.37½
Lead, St. Louis	3.97½	3.97½	3.97½	4.25
Tin, New York	25.80	26.35	27.80	24.75
Antimony, Hallett, New York	7.75	8.00	8.00	8.50
Nickel, New York	40.00	40.00	40.00	60.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	4.19	4.19	4.19	4.19

* For 1903. † Foreign.

Chicago.

FISHER BUILDING, September 24, 1902.—(*By Telegraph.*)

The local market for Pig Iron has been more unsettled and feverish than ever, the offerings of foreign metal introducing another element of an erratic character. There has been a less urgent demand for spot Iron, some consumers apparently having a more ample supply, but for next year's delivery the market is as firm as ever. The Coke supply is light and the deliveries intermittent. One of the features of the week has been the reported purchase of a large tonnage of Scrap Iron. This purchase, however, while it has just been made public, was made by a representative of a local firm in Europe some weeks since. There has been more activity in Steel Billets, a considerable tonnage being under negotiation. There has also been an increased demand for Structural Material, with some important negotiations in foreign Steel in progress. The demand for Rails, both Heavy and Light Sections, has continued actively and transactions are held in narrow limits only because of the inability of the mills to make the deliveries requested. Bar Iron has been somewhat irregular. Active competition is causing considerable agitation in the Light Sheet market and the product of independent Pipe mills is causing a somewhat unsettled feeling in Merchant Pipe. Tin Plate is also slow and easy, while Wire and Nails have sympathized more or less with the irregularity reported.

Pig Iron.—Foreign Iron has dominated the local market during the past week, not so much by way of sales as by freer offerings at lower prices, duty paid or in bond at Chicago. Several representatives of large Eastern and Pittsburgh houses have canvassed the local market pretty thoroughly during the past few days, the result being rather

to cause buyers to hold off than to increase purchases. If transactions of moment have been made they have not come to the surface. No. 2 foreign Iron has been offered at about $23, Chicago, duty paid, to arrive, but there is very little spot foreign Iron available and the few lots which are on the market are held at much higher prices, $26 to $27. Efforts have been made to interest local dealers as well as consumers in the purchase of large tonnage of both Scotch and German brands, but there seems to be less disposition to operate freely at the present time. Some consumers report that they are better supplied for current wants, some of them reporting better deliveries on old contracts. Other foundries have found as much difficulty as ever and one or two have already shut down or are running only a few heats during the week because of inability to obtain Iron in adequate amounts. There have been more ample offerings of local Iron for immediate delivery on a basis of $26 for No. 2, and some sales have been made on this basis. A few sales of Southern No. 2 Foundry ranging from carload lots to 100 and 200 ton lots were sold at about $27.15. There is an unsettled feeling, however, and prices vary widely. On the other hand, for next year's deliveries the market seems steady and some sales of moment have been made for delivery during the first six months of 1903. Lake Superior Charcoal has sold well, sales of about 9000 to 10,000 tons being made on the basis of quotations for first half of next year. There have also been sales of Virginia Iron at equivalent to the prices current for Southern Iron for delivery extending up to next July. One sale of 1200 tons of No. 1 Southern Foundry is reported to have been made on the basis of $21.50 at the furnace for the second half of 1903. This, however, is exceptional, few consumers being willing to contract for more than the first six months. Silvery Iron seems to be an exception to the rule, prices being well maintained, ranging from $29.15 to $32.15 for 4 to 8 per cent. Silicon for prompt delivery. Thus far it would seem that the supply of foreign metal has been insufficient to compensate for the loss by banking of local and Southern furnaces and no improvement has been made in the Coke supply during the week. The prices current for delivery during the first half of 1903 are as follows:

Lake Superior Charcoal	$26.00 to $27.00
Local Coke Foundry, No. 1	23.50 to 24.00
Local Coke Foundry, No. 2	23.00 to 23.50
Local Coke Foundry, No. 3	22.50 to 23.00
Local Scotch, No. 1	24.00 to 24.50
Ohio Strong Softeners, No. 1	25.50 to 26.50
Southern Silvery, according to Silicon	23.10 to 23.50
Southern Coke, No. 1	24.15 to 24.65
Southern Coke, No. 2	23.65 to 24.15
Southern Coke, No. 3	23.15 to 23.65
Southern Coke, No. 1 Soft	24.15 to 24.65
Southern Coke, No. 2 Soft	23.65 to 24.15
Foundry Forge	22.15 to 22.65
Southern Gray Forge	21.65 to 22.15
Southern Mottled	21.65 to 22.15
Southern Charcoal Softeners, according to Silicon	27.15 to 27.65
Alabama and Georgia Car Wheel	27.00 to 27.50
Malleable Bessemer	24.00 to 25.00
Standard Bessemer	25.00 to 26.00
Jackson County and Kentucky Silvery, 6 to 8 per cent. Silicon	27.60 to 28.60

Bars.—There have been very few large orders—that is, orders over 1000 tons—in the market during the week, and some of the mills have found it almost impossible to induce purchasers to specify on old contracts. Prices have shown more irregularity, with moderate sales at 1.85c. to 1.95c. basis, Chicago. Soft Steel Bars have remained steady, but without special animation in the market. The following are the prices current: Soft Steel Bars, 1.75c. to 1.90c.; Hoops, 2.10c. to 2.25c.; Angles, 1.85c. to 1.95c., base, mill shipments. The demand for Bars and Angles for shipment from local stock has continued active and the market firm at the following prices: Bar Iron, 2.25c.; Soft Steel Bars, 2c. to 2.25c.; Angles, 2.50c., and Hoops, 2.50c., from store.

Structural Material.—The temper of the market has changed but little if any during the week, there being no perceptible falling off in the demand for either this or next year's deliveries; but, as heretofore, it has been only in exceptional instances that buyers have been able to secure material for the remainder of the current year. For next year's delivery about 5000 tons have been sold, half the tonnage coming from bridge works. Contracts for the Schlesinger & Mayer Building, requiring about 2500 tons, are said to have been placed recently and there are other local buildings for which contracts will be placed in the near future. There is an increased demand for foreign Steel, contracts for about 2500 tons of Channels, Beams and Angles being under negotiations which will probably be closed this week. The prices current for domestic Steel, mill shipment, are as follows: Beams, Channels and Zees, 15 inches and under, 1.75c. to 1.90c.; 18 inches and over, 1.85c. to 2c.; Angles, 1.75c. to 1.90c. rates; Tees, 1.80c. to 1.90c.; Universal Plates, 1.75c. to 1.85c. The urgent demand for quick shipment from local stocks has continued as pressing as ever and premiums ranging from $2 to $5 per ton are obtained over quotations: Beams and Channels are wanted at 2.50c. to 3.50c.; Angles, 2.50c. to 3.50c.; Tees, 2.55c. to 3.50c. at local yards, but premiums are frequently paid for special sizes.

Plates.—Most of the mills are sold as far ahead as ever, some of them as late as July next year. While shipments have been considerable they are little if any more than the current new business resulting in a very strong market. The following are the prices current: Tank Steel, ¼-inch and heavier, 1.75c. to 2.25c.; Flange, 1.85c. to 2.35c.; Marine, 1.95c. to 2.50c. The demand for quick shipment from local stocks continues active and way beyond the ability of dealers to supply. We quote: Tank Steel, ¼-inch and heavier, 2.50c. to 2.50c.; Tank Steel, No. 8, 2.45c. to 2.55c.; Flange, 2.50c. to 2.75c., all f.o.b. warehouse, Chicago.

Sheets.—The volume of business in both Heavy and Light Sheets is liberal, and the demand continues active, but with the keen competition of independent mills, who are offering freely, the market is still unsettled and prices irregular. The jobbing demand is also on a liberal scale, some dealers reporting the volume of business transacted during the last three months the largest in a like period in the history of trade, but there is a determined fight and prices are unsettled. Quotations are as follows: No. 27 Black Sheets sell at 3.05c. to 3.15c., mill shipment; small lots from store are offered at 3.25c. to 3.35c., Chicago. Mill shipments of Galvanized Sheets are held at 4.05c. to 4.25c., net, while small lots from store are selling at 4.30c. to 4.40c. for No. 27.

Cast Pipe.—There continues to be unusually liberal buying by water and gas companies and by railroads, but few municipal contracts have been placed. At Milwaukee and Findlay, Ohio, all offers were rejected, but at the latter place new bids will be read on October 8. One thousand tons of 30's have been sold to Denver, Col., and 1000 tons of smaller sizes for Fairmount, W. Va. Manufacturers continue to sell small lots at the following prices: 4-inch, $35.75 to $36; 6-inch, $33.75 to $34; 8-inch and upward, $33. Gas Pipe, $1 per ton higher than Water, f.o.b. Chicago.

Merchant Pipe.—No improvement is noted in the market, prices being unsettled by active competition, large discounts being offered on mill shipments by independent mills. The following are the prices current, random lengths. Chicago: Black, ⅛ to ½ inch, 56½ off; ¾ to 12 inches, 63½ off; Galvanized, ⅛ to ½ inch, 43½ off; ¾ to 12 inches, 50½ off.

Boiler Tubes.—There has been a fair demand and a steady market without new features. Prices for mill shipment are as follows:

	Steel.	Iron.
1 to 1¼ inches	42½	39
1¾ to 2½ inches	55½	38
2¾ to 5 inches	61	48
6 inches and larger	55½	38

There has been a moderate degree of activity from store, and the market has remained steady at the following prices:

1 to 1½ inches	35	35
1¾ to 2½ inches	47½	32½
2¾ to 5 inches	55	42½
6 inches and larger	47½	..

Merchant Steel.—There is liberal specifying on previous contracts, and considerable new business for certain grades, especially of Machinery and Tool Steel. For mill shipment prices are as follows: Smooth Finished Machinery Steel, 2c. to 2.10c.; Smooth Finished Tire, 1.95c. to 2.10c.; Open Hearth Spring Steel, 2.65c. to 2.75c.; Toe Calk, 2.25c. to 2.40c.; Sleigh Shoe, 1.85c. to 1.90c.; Cutter Shoe, 2.40c. to 2.60c.; Cold Rolled Shafting, 50 off in carload lots. Ordinary grades of Crucible Tool Steel are quoted at 6½c. to 7c. for mill shipment; specials, 12c. upward.

Rails and Track Supplies.—The demand for both Heavy and Light Sections for delivery both this year and next continues very active, there being a number of contracts under negotiation, but sales during the week have not aggregated over 20,000 tons, half of which was booked by local representatives of Eastern mills. Most of the sales are in relatively small lots, ranging from 1000 to 2500 tons each. The demand from electric railways is increasing. Light Rails have commanded premiums for immediate delivery. Official prices remain $28 for Standard and $27 for second quality, mill shipment. Lighter weights range from $32 to $35 in carload lots, according to weight and time of delivery. Jobbing sales have been made at a premium of $3 to $5 per ton. Track Supplies of all kinds have continued active, and the market has remained firm. The following are the prices current: Splice Bars or Angle Bars, 2c.; Spikes, 2.50c.; Track Bolts, with Hexagon Nuts, 3.10c. to 3.45c.; Square Nuts, 2.95c. to 3.10c.

Billets.—There has been but little movement in domestic Billets, which have reflected the freer offerings of foreign Steel, of which a considerable quantity is under negotiation. The latter part of last week about 10,000 tons of foreign Billets sold as small lots equivalent to $30.65, Chicago, but round lots probably would bring between $29.50 and $30. Two lots, aggregating between 18,000 and 20,000 tons, are under negotiation for early shipment. Open Hearth domestic Billets are quoted at $35 to $37, but small lots continue to be sold at $38 to $40, according to buyer, analysis and time of delivery.

Old Material.—The principal feature of the market is a report of the purchase of 50,000 tons of foreign Scrap made up largely of Iron Rails, Heavy Steel Melting Scrap and Railroad Wrought. About 20,000 tons are said to have been resold. One thousand tons of Heavy Rails from Hamburg are reported to have been sold for delivery near St. Louis at about $19; 3000 tons of No. 1 Railroad Wrought, domestic, sold at $21.75, and several thousand tons of Old Iron Rails, domestic, at $25 to $25.25, Chicago, and delivery at Chattanooga, Tenn. Heavy Relaying Rails have been in more active demand, with sales of 300 tons at $31.50 and 3000 tons at $32, Chicago. Agricultural Malleable is about 50c. higher. The following are the prices current per gross ton, Chicago:

Old Iron Rails	$25.00 to $25.50
Old Steel Rails, mixed lengths	19.00 to 19.25
Old Steel Rails, long lengths	23.50 to 24.50
Heavy Relaying Rails	31.50 to 32.00
Old Car Wheels	21.00 to 22.00
Heavy Melting Steel Scrap	18.50 to 19.00
Mixed Steel	15.50 to 16.00

The following quotations are per net ton:

Iron Fish Plates	$22.50 to $22.75
Iron Car Axles	25.00 to 26.00
Steel Car Axles	23.50 to 24.00
No. 1 Railroad Wrought	21.50 to 22.00
No. 2 Railroad Wrought	.... to 19.00
Shafting	20.00 to 21.00
No. 1 Dealers' Forge	17.50 to 18.00
No. 1 Busheling and Wrought Pipe	15.00 to 15.50
Iron Axle Turnings	15.00 to 15.50
Soft Steel Axle Turnings	14.50 to 14.75
Machine Shop Turnings	14.25 to 14.75
Cast Borings	10.25 to 10.75
Mixed Borings, &c	10.50 to 11.50
No. 1 Boilers, cut	14.50 to 15.00
Heavy Cast Scrap	17.00 to 17.50
Stove Plate and Light Cast Scrap	12.50 to 13.00
Railroad Malleable	16.25 to 16.75
Agricultural Malleable	15.50 to 16.00

Metals.—A weaker tone has been developed in Copper Ingots in sympathy with primary markets. Lake is now quoted at 12c. to 12¼c. in car lots and 12¼c. to 12½c. in a jobbing way. Pig Lead has continued active and firm at 4.05c. for 500-ton lots and 4.07½c. in carload lots. Sheet Zinc has been in active demand and firm at 6½c. in carload lots and 6.65c. in lots of 600 lbs. Old Metals have been moderately active, but while Zinc has continued firm a weaker feeling has been developed in Copper and Brass and the tendency is downward. The following are the prices current: Heavy Cut Copper, 10¾c.; Red Brass, 10½c.; Copper Bottoms, 9½c.; Lead Pipe, 3.90c.; Zinc, 3.75c.

Coke.—The market is still chaotic. There has been no improvement in the supply of spot Coke, and the little offered is sold at all sorts of prices, ranging from $11 to $15 on track. It is reported that a schedule of prices has been issued by some of the Virginia Coke companies which calls for $6 at the ovens for the first three months of next year, $5 at the ovens for the first half and $4 for the full year for Foundry Coke, freight to Chicago being $2.95.

The following sales of Pig Iron are reported: 40,000 tons lower grades of foreign Iron, for Pipe works, for delivery at Ohio and Kentucky points, at prices ranging from $19 to $20, duty paid; several thousand tons of No. 2 foreign at about $23, duty paid, Chicago; 200 tons standard Bessemer Valley Iron at $24.35 and 100 tons ditto at $25, delivered, Chicago; 200 tons ditto at $22.25, at Valley, October delivery. A report is current that some large consumers, being unable to obtain sufficient Iron for current necessities, have determined to go into the open market and purchase at the best price, and charge the difference to sellers who have failed to keep contracts. This has not been verified, however.

The capital stock of the Wayne Iron Company, Limited, is $200,000, not $300,000, as reported.

Philadelphia.

FORREST BUILDING, September 23, 1902.

The only feature of importance in connection with the Iron and Steel trade during the week has been the increasing scarcity of Coke and the higher prices which have to be paid for it. This is beginning to be a most serious matter, as very close to $10 per ton has been paid for September and October shipments. When this has to go into $18 to $20 Pig Iron there is not much in it for the Pig Iron producer. Nevertheless, prospects for any material reduction in prices are not encouraging. Negotiations have been opened for foreign Coke, and shipments from Canada are expected here soon. English Coke has been offered at a trifle over $8 per ton, but it is hardly likely that sales will be made, Coke being a hard thing to handle, particularly for ocean transportation. As regards Pig Iron the situation is not in any respect different from last week. Anything on the spot or to arrive within a very brief period sells easily at the full prices of last week, and although the arrivals are heavy they are taken as quickly as they can be unloaded. Consumers are not placing contracts abroad, however, that part of the business being left to importers, who so far have had very satisfactory results. Prices abroad are said to be firmer, and freights are also a little dearer, but things in Europe appear to be so bad that no important advance is expected, while a slight recession is by no means improbable. Importers, therefore, offer Iron at least week's prices, and so long as the present outlook continues shipments will no doubt be made pretty regularly. American Iron is dull, comparatively speaking. The bulk of the Iron that goes into consumption is the product of American furnaces, but there is not enough of it to go around, so that the 10 or 15 per cent. shortage, or whatever it may be, is made up from foreign Iron. It is curious to note how suspicious foreigners are in regard to the continuance of the American demand. They seem to imagine that every shipment is liable to be the last, while some on this side are fearful that the supply will give out before our own furnaces will be in a position to furnish the much needed article. The demand will end some time, of course, but at present there is not the slightest indication of its doing so, neither is there any satisfactory evidence that the home production is likely to be large enough to meet current requirements for months to come. Winter is rapidly approaching, and even under the most favorable conditions production cannot be materially increased until toward spring. Everything is so far behind that it will require months to catch up, and in the meanwhile high prices are inevitable. They may not go beyond their present level, but it is almost certain that they will not go below it. This feeling is so general that long contracts are not regarded as desirable by either buyers or sellers—the former being of opinion that prices are high enough, while in view of the Coal and Coke situation sellers are confronted with costs such as they have never known until now. Meanwhile close sailing, as regards both buying and selling, will no doubt be a leading feature during the next two or three months.

Pig Iron.—It is a long time since there was as much trading in small lots as there is at the present time. One reason is that large lots are not available, another is that nobody seems inclined to make extended engagements. Prices are high and the outlook extremely uncertain as regards fuel and transportation, so that it is almost impossible to form any definite opinion as to the ultimate outcome, consequently so long as present requirements can be provided for both buyers and sellers are willing to drift along with the tide. Most of the sales are of foreign Iron, of which there is an almost endless variety. Nearly all the commission houses are handling this class of Iron, as their customers must have material from some source, and in their interests Iron is being imported either by purchase in Europe or by consignment to commission houses. It is a new business to many, but under the stress of circumstances the trade are adapting themselves to the changed conditions. Sales of Scotch Irons are made at $22.50 to $23.50, on dock, duty paid, and Middlesbro at $20.75 to $21.25. These prices are for lots of 100 tons and upward, but 1000-ton lots and larger could be had at 50c. to 75c. less. The cost of removal to consumers' yards must be added to these figures, which is about 50c. per ton for city and 75c. to $1 to outlying points, such as Lebanon, Reading, &c. American Irons are in all respects unchanged from last week, but there is very little doing except when deliveries can be made before the close of the year, in which case No. 2 X will bring $23.50 to $24. Basic has been sold in small lots at $21.50 for this year and equivalent to nearly $1 less for the first half of 1903. Low Phosphorus is scarce and commands $25 at furnace when there is any to be had; one or two small lots sold at that figure. General quotations are practically the same as a week ago, viz.: Cargo lots, c.i.f., at about $19.50 for Middlesbro No. 3; small lots, $20.50 to $21; Scotch, alongside ship, $22.50 to $23.50. Scotch Iron ranges from $22.50 to $23.50, and American at about the same figures as quoted in our last, for city or nearby deliveries during the first half of next year, and $1 to $1.50 more for this year's deliveries.

No. 1 X Foundry		$23.50 to $24.50
No. 2 X Foundry		22.00 to 22.50
No. 2 Plain		21.00 to 22.00
Standard Gray Forge		19.50 to 20.50
Basic		20.50 to 21.00
Low Phosphorus	Prompt shipments or spot.	25.50 to 26.00
No. 3 Middlesbro		21.00 to 21.50
Scotch Irons		23.00 to 24.00

Billets.—There has been considerable inquiry for Steel and prices are a shade firmer, but nothing of importance has been done since last week. Foreign Bessemer is quoted at about $27, Open Hearth at $28 and upward, according to what analysis may be required.

Plates.—There is a very heavy demand and prices are increasingly strong. Orders for large lots are offered, but unless full figures are obtained the business is turned down. Several thousand tons have been refused when a very slight concession would have taken the order; but as mills are crowded with work, manufacturers are more disposed to advance than to reduce their prices. Meanwhile last week's figures are continued, as follows: Small lots, 2.10c. to 2.15c.; carload lots, ¼-inch and thicker, 2c. to 2.05c.; Universals, 2c. to 2.05c.; Flange, 2.10c. to 2.20c.; Fire Box, 2.25c. to 2.30c.; Marine, 2.30c. to 2.35c.; Charcoal Plates, C. H. No. 1, 2½c.; C. H. No. 1 Flange, 3c.; C. H. No. 1 Flange Fire Box, 3½c.

Structural Material.—There is a large business doing,

but prices are not as rigid as they were some time ago. Large lots have been brought in from abroad, and as deliveries are well up to dates specified consumers are taking foreign material with considerable confidence. The home supply is also increasing, so that prices are easier all around. The Eastern Steel Company at Pottsville expect to be rolling Shapes some time during the coming month; so that with these various sources of supply less trouble is expected in getting deliveries than has been the case during the past several months. To-day's prices are about as follows for city or nearby deliveries: Deliveries for mill specifications command all the way from 2.35c. to 2.50c. Store lots can be had of most of the leading sizes at something less than the above figures, and for direct importations of large lots 2.10c. to 2.15c. could be done. The official figures based on Pittsburgh quotations are 1.72c. to 1.80c., but these are for deliveries at some period in the indefinite future.

Bars.—There is nothing special to report under this heading. Mills are well employed and prices are steady, but there is no difficulty in getting prompt deliveries. Sales are made at the following figures: 1.92c. to 1.97c. for Refined Bars in carload lots as a minimum and 2c. to 2.15c. for Steel Bars, prompt delivery. The West quotes 1.75c. to 1.80c., but no guarantee as to date of delivery.

Sheets.—There are no new features in the Sheet trade. The demand is fair and prices about the same as quoted last week for ordinary sized lots of Best Sheets (Common one-tenth to two-tenths less): Nos. 10 and 12, 2.30c. to 2.40c.; No. 14, 2.50c.; Nos. 16 and 17, 2.70c.; Nos. 18-21, 3c.; Nos. 26, 27, 3.10c.; No. 28, 3.30c.

Old Material.—The demand is better and in most cases higher prices are realized, particularly for good No. 1 Wrought and Heavy Melting Steel. The offerings are not large, however, the following being a fair average for lots delivered in buyer's yards:

Old Steel Rails	$21.50 to $22.00
Heavy Steel Scrap	20.50 to 21.00
Low Phosphorus Scrap	26.50 to 28.00
Old Steel Axles	26.00 to 27.00
Old Iron Rails	25.00 to 26.00
Old Iron Axles	30.00 to 31.00
Old Car Wheels	20.00 to 21.00
Choice Scrap, R. R. No. 1 Wrought	24.50 to 25.50
Country Scrap	21.00 to 22.00
Machinery Cast	19.00 to 20.00
No. 2 Light Scrap	17.00 to 18.00
No. 2 Light Scrap (Ordinary)	14.50 to 15.00
Wrought Turnings	16.00 to 17.00
Wrought Turnings, Choice Heavy	18.00 to 18.50
Cast Borings	10.00 to 10.50

Cincinnati.

FIFTH AND MAIN STS., September 24, 1902.—(*By Telegraph.*)

One of the most prominent factors in the Pig Iron situation is the question of Foundry Coke. Within a few days the situation has become so acute in this regard that to-day Coke is quoted, f.o.b. Cincinnati, $10 to $11 per ton, a price which in itself looks almost prohibitive, but even on this basis foundrymen would be glad to receive a supply, which does not appear to be forthcoming. This, of course, has put quite a damper on melting operations, and spot Iron as a consequence is not so freely in demand. Nevertheless the prices have not weakened a particle and, if anything, are higher to-day than they have been. It is now regarded as a certainty that foreign Iron is to cut quite a figure in the general field. It is said to have been sold in moderate quantities at different points in the interior towns of Ohio, and as the margin is said to be about $3 in favor of the imported Iron as against the Southern product, one of two things will be brought to pass, either the Southern Iron will weaken to that extent or the foreign will rise in the way of compromise. When it comes to Iron for delivery after the first of the year the situation is decidedly strong, and while there are said to be some furnaces who are accepting a little business on the basis of $18.50 to $19, yet the great majority of Southern furnaces are holding, where they have stock to sell, to the basis of $20, Birmingham, for No. 2 Foundry. For spot delivery No. 2 is quotable by reason of a small sale reported on the basis of $23 and upward, Birmingham. Freight rate from the Hanging Rock district is $1.10, and from Birmingham to Ohio River points $3.25. We quote, f.o.b. Cincinnati, for 1902 delivery, as follows:

Southern Coke, No. 1	$26.75 to $27.25
Southern Coke, No. 2	26.25 to 26.50
Southern Coke, No. 3	23.50 to 24.50
Southern Coke, No. 4	21.25 to 22.00
Southern Coke, No. 1 Soft	.... to 26.25
Southern Coke, No. 2 Soft	.... to 25.75
Southern Coke, Gray Forge	19.00 to 20.00
Southern Coke, Mottled	19.00 to 20.00
Ohio Silvery, No. 1	29.10 to 29.60
Ohio Silvery, No. 2	.... to ....
Lake Superior Coke, No. 1	26.10 to 26.60
Lake Superior Coke, No. 2	25.60 to 26.10
Lake Superior Coke, No. 3	25.10 to 25.60
Car Wheel and Malleable Irons.	
Standard Southern Car Wheel, chilling grades	$26.75 to $ 27.75
Lake Superior Car Wheel and Malleable	25.00 to 26.25

Quotations for first six months of 1903, f.o.b. Cincinnati, the buyer to assume freight difference which may exist at time of shipment, are as follows:

Southern Coke, No 1	$22.75 to $24.00
Southern Coke, No. 2	22.25 to 23.25
Southern Coke, No. 3	21.75 to 22.75
Southern Coke, No. 4	21.25 to 22.75
Southern Coke, Gray Forge	21.25 to 22.25
Southern Coke, Mottled	21.25 to 22.25
Southern Coke, No. 1 Soft	22.75 to 24.00
Southern Coke, No. 2 Soft	22.25 to 23.25
Lake Superior Coke, No. 1	24.10 to 24.60
Lake Superior Coke, No. 2	23.60 to 24.10

Old Material.—There is but little difference in the general situation and but few minor changes in the quotation list. Cast Scrap alone is distinguished by special strength. We quote dealers' buying prices, f.o.b. Cincinnati, as follows: No. 1 Wrought Railroad Scrap, $21 per net ton; Cast Scrap, $17 to $17.50 per gross ton; Iron Rails, $24 to $24.50, gross; Steel Rails, long, $24 to $24.50, gross; Steel Rails, short, $18.50 to $19, gross; Iron Axles, $27.75 to $28.25, net; Car Wheels, $20.75 to $21, gross.

Iron Bars.—The market is generally quiet and practically unchanged. We quote, f.o.b. Cincinnati: Iron Bars, in carload lots, 1.92c., with half extras. Less than carload lots, 2.02c., with full extras; Steel Bars, 1.72c. for carload lots ,with half extras; Base Angles, 2.25c. Plates, 3-16 and heavier, 2.15c., carload lots.

Cleveland.

CLEVELAND, OHIO, September 23, 1902.

Iron Ore.—The movement of Iron Ore continues at a higher rate than had been expected for this month and indications now are that September shipments will be only about 10 per cent. less than August. Such a slight falling off for September will establish a new record. A movement of 3,000,000 tons would have sufficed to bring the aggregate shipment for the year up to what was intended. Instead, it seems possible that the total will be nearer 3,750,000 tons. Unusual conditions have conduced to this end. The demand for boats in other trades has been very light and in fact the grain and Coal trades have not yet started to command that share of the lake tonnage which is allotted to them. This being the case, the Ore trade has absorbed all of the tonnage, and it seems altogether possible that the Ore shippers will get through the year without any material increase in the rates demanded by the vessel owners. Rates of carriage therefore remain at 75c. from Duluth, 65c. from Marquette, and 60c. from Escanaba.

Pig Iron.—The production of Pig Iron has increased considerably during the past week owing to the better supply of Coke, but inquiries for material have likewise increased so that the net gain to the consumer is not very great. While the supply lasts all furnaces are producing at full capacity and have passed the stage now where inferior Iron is being made. With the foundry furnaces in the Valleys the production has all been applied on contracts, as none of them are up with the requirements of contracts. This, therefore, is precluding the possibility of any of the present output finding its way on the market. A due proportion of the imports of Foundry Iron is being received in this territory, but even this is not meeting the requirements of the trade. The knowledge that Iron is being imported and that the supply is being increased, therefore, although ever so slightly, seems to have called out some needs that were pushed into the background because of the seeming impossibility to obtain material. The inquiries that are coming in consequently are very heavy and it seems possible that a much greater quantity of Iron than is now being made could be used. The beginning of the fall trade has also added a certain activity to the market and has increased the demand. Quotations for immediate delivery are out of the question. The inquiries that have been made during the last week have developed the fact that the supply of the Valley and Southern Ohio furnaces has been completely exhausted for this year. The Southern furnaces seem to be in but little better shape, and from present indications any further supply of Iron than that provided for in contracts must come from other than the home markets. Nominally, prices for this year's delivery continue at $25 for No. 2 Foundry at Valley furnace; $20 for No. 2 Southern Foundry, at Birmingham, and $23.50, delivered, for foreign No. 1 Iron, which analyzes between No. 1 and No. 2 domestic Iron. There is considerable interest in material for next year's delivery for which the foundry producers are getting $21 for No. 2 at Valley furnace and on which Southern producers are asking from $18 to $20, Birmingham. There is a considerable demand for Basic Iron for delivery during the first half of next year and reports are around that some good sized sales have been made during the week just closed at $21. The scarcity of the material and the knowledge that much that ought to be delivered this year will be carried over into next have increased the price. Some few Basic producers are said to have small lots for delivery during the latter part of November and December of this year, but are not quoting a price as yet. There is also talk of importing, but this has not been done. Some small lots of Bessemer are said to have been sold for delivery during the first half of next year at $22, furnaces outside of the association having closed the deals. The association has done nothing so

far. Small lots of Bessemer are being imported at prices less than are prevailing on the market, but they are not quoted.

Finished Material.—The American Shipbuilding Company have been a heavy buyer of Structural Steel and Plates during the week that has just closed. One of their orders aggregates 13,000 tons of Ship Steel, which it is understood has been taken by mills in the Pittsburgh district under contract to deliver it the first part of next year. They have just closed contracts for six Steel ships, which brings the total to be built during the coming winter up to 34. Most of the Steel has been purchased through the Cleveland office and it is understood that the aggregate quantity has ranged between 50,000 and 55,000 tons of Plates and Shapes combined. During August it was necessary for this company to import Structural Steel and large Plates to complete some of the contracts they had previously taken. When the orders recently taken were pending it seemed possible that if the ships were to be built the Steel would have to be imported. The home mills, however, have been able to care for the demand. This order will about take up the entire supply of Structural Steel from the Pittsburgh district for the first half of next year, and any material of any consequence sold hereafter for delivery during that period must of necessity come from the mills demanding premiums. It is possible that the premiums to be obtained will be limited by foreign competition, although at present small mills are selling at 2.60c. at the mill, while jobbers are getting 2.50c. to 3c., Cleveland. All of the big sales for the first-half delivery have been made at the old association price of 1.60c., Pittsburgh. It is now a question whether the amount of Plates included in the ship order and coming from the Pittsburgh district has not overtaxed those mills for the first half of next year. Two weeks ago the question of overselling was raised, since which time several large quantities have been placed on the order books. For the present all of the Plate sales are being made at 1.60c., Pittsburgh, for next year's delivery. A few spot sales are being made at 2c. at the mills, with a few orders accepted for January delivery at that price. Jobbers are getting 2.50c. for such material as they have. There is still a good call for 3-16-inch Plates and the price holds up well. It is quite evident that the Sheet mills, however, lack orders and are very anxious to get them. There has been some talk of shading the present mill prices to induce immediate specifications, but it has not been done generally so far. Whether any favorite buyers have received such concession is another question, but it is not out of line with the present market. The mill quotations on Black Sheets, therefore, continue at 3.10c. to 3.20c. for No. 27 as a basis, while jobbers are quoting 3.35c. to 3.50c., Cleveland. Galvanized Sheets are still weak at 4.50c. for No. 27. The demand for Bar Steel has kept up well, with some contracts booked for delivery during the first quarter of next year. The prices have not changed from 1.60c., Pittsburgh, for Bessemer and 1.70c., Pittsburgh, for Open Hearth. Bar Iron mills are looking for business and prices have been shaded a little on the quiet, although no general reduction has been made. The market quotation holds at 1.80c., Pittsburgh, with the understanding that 1.70c., or perhaps better, might be done on choice specifications. The Billet situation is also unchanged, importations being made at $28, while the home mills have been asking $30, with the possibility of a reduction to the import price.

Old Material.—There has been a sharp call for both Mill and Cast Scrap this week. In fact, the demand has about equaled a boom, being much in excess of previous requirements. Revised and advanced prices are as follows: No. 1 Wrought, $21, net; Iron Rails, $27.50, gross; Iron Axles, $28, net; Cast Borings, $12, gross; Wrought Turnings, $16.50, gross; Cast Scrap, $17.50, net; Car Wheels, $19, gross; Heavy Melting Steel, $19, gross; Old Steel Rails, $20, gross.

Pittsburgh

(By Telegraph.)

PARK BUILDING, September 24, 1902.

Pig Iron.—The best feature of the Pig Iron situation is that Coke shipments have greatly improved and so far this week have been very good. The Pig Iron market is quiet as far as actual sales go, but prices are very firm. Bessemer Pig for shipment this year is $21.75 to $22 at furnace, but in competition with foreign Iron lower prices would be made if necessary to take the business. There is a strong disposition on the part of Pig Iron sellers to keep foreign Iron out of this market. Prices on foreign Bessemer Pig are higher than a week ago and range from $22 to $22.50, Pittsburgh, very close to prices of domestic Iron. Forge Iron is somewhat quiet and is $20.75 to $21, Pittsburgh. No. 2 Foundry Iron is very firm and for prompt delivery has sold at $23 at furnace, equal to $23.75 Pittsburgh. For delivery in next year No. 2 Iron could be bought at much lower prices.

Steel.—The market on both domestic and foreign Steel is firmer; foreign Billets are quoted at $29 to $29.50, Pittsburgh, while domestic is held at $31 to $31.50, with some sellers quoting $32. There is not much buying in Steel, consumers going very slow, believing that prices will be lower.

(By Mail.)

Coke shipments last week were much better than for some time, and the furnaces were able to get out practically their full output of Iron. While Coke supply is not as good as it ought to be, yet it is hoped the worst of the trouble is over. Plenty of Coke is being made to keep the furnaces fully supplied, but the trouble has been to get motive power to move it. Not much has been done in the past week in the matter of importing further lots of Pig Iron or Steel, mainly for the reason that prices have gone up on the other side at least $1 a ton, and local consumers are not disposed to pay the higher prices quoted. Foreign Bessemer Pig Iron is now quoted all the way from $22 to $22.50, Pittsburgh, and foreign Billets from $29.50 to $30. There is a strong disposition on the part of local producers to meet foreign prices of Pig Iron and Steel and stop importations. Domestic Bessemer Pig for shipment this year is quoted at $21.75 to $22, Valley furnace, but in competition with foreign Iron it is possible lower prices would be made. Bessemer Iron for shipment in first quarter is held at about $21, at furnace. Domestic Steel is quoted at $31 to $31.50, Pittsburgh. Tonnage in Structural Shapes and Plates continues very heavy, but on other finished lines of Iron and Steel, such as Sheets, Bars, Tin Plate, Pipe and Wire products, the market is quiet. Tin Plate and Sheets are the dullest articles on the entire list, and on Galvanized Sheets some very low prices are being made.

Muck Bar.—We quote domestic Muck Bar at $35.50 to $36, Pittsburgh. Sales of 3000 to 4000 tons for delivery in first quarter are reported on the basis of $36, Pittsburgh. Eastern Muck Bar is being offered at $35, Pittsburgh, or less.

Structural Material.—Heavy contracts are being placed for bridge work, and building projects for next year are increasing in number. The outlook for the Structural trade is very bright. Some negotiations are on for importations of Beams and Channels, but so far not much has been done. For prompt delivery Beams and Channels continue to bring 2.50c. to 3c. and higher. Pool prices, which apply only on Shapes for extended delivery, are as follows: Beams and Channels, up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6 inch, 1.60c.; smaller sizes, 1.55c. to 1.60c.; Zees, 1.60c.; Tees, 1.65c.; Steel Bars, 1.60c., half extras, at mill; Universal and Sheared Plates, 1.60c. to 1.85c.

Rods.—There is not much improvement in demand, and we continue to quote Bessemer Rods at $35.50 to $36, and Open Hearth $36.50 to $37, Pittsburgh.

Ferromanganese.—We continue to quote German and English Ferro at $51 to $51.25, f.o.b. Pittsburgh. There is not much doing, as consumers are covered.

Bars.—A fair amount of tonnage is being placed in Iron and Steel Bars, but buyers are confining their purchases mostly to small lots, being somewhat apprehensive that present prices may not hold. Consumers are not specifying on old contracts as fast as the mills would like. We quote Steel Bars at 1.60c., at mill. All specifications for less than 2000 lbs. of a size are subject to the following differential extras: Quantities less than 2000 lbs., but not less than 1000 lbs., 0.10c. per lb. extra. Quantities less than 1000 lbs., 0.30c. per lb. extra, the total weight of a size to determine the extra, regardless of length. We quote Iron Bars at 1.80c. to 1.85c. in carloads and 1.90c. in small lots, f.o.b. Pittsburgh, half extras as per National card.

Hoops and Bands.—There is only a moderate tonnage, and reports are that prices are being shaded more or less, depending on the nature of the order. We quote Hoops at 1.90c. for 250-ton lots and over and 2c. in carloads. Bands are 1.90c. for Bessemer stock, 12-gauge and heavier, while for Open Hearth stock $2 per ton advance is charged.

Plates.—We note a continued heavy tonnage in Plates, and we may state that one or two of the leading mills are practically out of the market as sellers of Plates, ¼-inch and heavier, for first six months of 1903. In fact, most of the Plate mills have very little tonnage to spare for this year and have a good deal of business booked for first six months. Like Rails, a good deal of tonnage in Plates that should have been delivered this year will have to be carried over into 1903, owing to crowded condition of the mills. A meeting of the Plate Association will be held in New York on Thursday, October 9, but it is not believed any important action will be taken or any change made in prices. Plates for shipment within the next three or four months readily bring 1.75c. to 1.85c., at mill, for ¼-inch and heavier. Official prices which govern Plates for delivery in next year are as follows: Tank Plate, ¼ inch thick and up to 100 inches in width, 1.60c., at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine, Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.80c.; Still Bottom Steel, 1.90c.; Locomotive Fire Box, not less than 2.10c., and it ranges in price to 3c. Plate more than 100 inches wide, 5c. extra per 100 lbs. Plate 3-16 inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra; No. 9, $5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms, net cash in 30 days.

Sheets.—There is no improvement to be noted in demand for either Black or Galvanized Sheets, but, on the contrary,

several mills report the situation as regards new tonnage as being more disappointing than for some time. So much new capacity in Sheets has come on the market in the last six months that the present falling off in demand is very keenly felt. However, the decline in prices has been comparatively slight, owing largely to the high price of Sheet Bars and Billets. We quote No. 27 Black Sheets, box annealed, one pass through cold rolls, at 2.85c. to 2.90c. and No. 28 at 2.95c. to 3c., in carload lots. There have been rumors of slightly lower prices, but they have not been confirmed. Prices of Galvanized Sheets are somewhat demoralized and 75 and 7½ off is being done on attractive orders. The general market is 75 and 5 off in carloads and 75 off in small lots, and some mills advise us they are not shading these prices. The above quotations are f.o.b. at mill.

Skelp.—The market continues very quiet and prices are extremely weak. We quote Grooved Iron Skelp at 2.02½c. to 2.05c. and Sheared at 2.10c. to 2.15c. Steel Skelp is held at about 2.15c., Pittsburgh.

Merchant Pipe.—A fair amount of tonnage is being placed, but there is more or less cutting in prices by the outside mills, depending on the nature of the order. Discounts to jobbers in carloads are as follows:

Merchant Pipe.	Black.	Galvd.
⅛ to ½ inch, inclusive.....	60	48
¾ to 12 inch, inclusive.....	67	55

We may note, however, that the above discounts are shaded more or less.

Merchant Steel.—The tone of the market is fairly strong and some fair sized contracts are being placed by carriage and implement manufacturers. Prices in carload lots are as follows: Tire, 2.15c. to 2.25c.; Spring, 2.25c. to 2.35c.; Toe Calk, 2.30c. to 2.40c., base; Sleigh Shoe, 2.15c. to 2.25c. Differentials are as follows: Less than 2000 lbs. of a size and not less than 1000 lbs., 10c. advance; less than 1000 lbs. of a size, 30c. advance; Cold Rolled Shafting is 47 per cent. off in carloads and 42 per cent. in less than carloads delivered in territory east of the Mississippi and north of the Ohio rivers. Tool Steel is 6½c. to 10c. for ordinary grades and 12c. and upward for special grades.

Iron and Steel Scrap.—The market on Old Material continues active, the scarcity and high prices of Pig Iron causing consumers to use larger quantities of Scrap than heretofore. This is particularly true of Cast Scrap, Heavy Melting Stock and Old Car Wheels, all of which are in very active demand and bring high prices. We continue to quote No. 1 Railroad Wrought Scrap at $21.50 to $22 in net tons. Cast Iron Borings, $12.50 to $13, gross tons, either the Valley or Pittsburgh delivery. Heavy Melting Stock is very firm at $22 in gross tons, Car Wheels bring $21.75 to $22 in gross tons, Cast Iron Borings are $19.50 to $19.75, gross tons, and No. 1 Busheling Scrap $18 in net tons and Wrought Iron Turnings about $14 in net tons. We note sales of 3000 tons of Heavy Melting Stock at $22 and 1000 tons of Cast Iron Borings at $19.50, Pittsburgh.

Connellsville Coke.—Output of Coke in the upper and lower Connellsville region last week amounted to nearly 300,000 tons. The total number of ovens in the upper Connellsville region is 21,722, and of this number 21,148 were active. In the lower Connellsville region there are 3811 ovens, of which 3665 were active. The continuance of the Hard Coal strike is causing an extraordinary demand for Coke and unheard of prices are being paid. Thousands of tons of 72-hour Coke have been sold at $7.50 at the oven, for delivery in Chicago, the freight rate being $2.50 a ton. It is said that in Baltimore there is not 1000 tons of Hard Coal in stock. Former consumers are now buying Coke and paying $10 to $12 a ton delivery for it. Furnace Coke is selling from $4.50 up to $6 and $7 a ton at oven for prompt shipment, and as high as $8 has been paid in exceptional cases. As yet very little has been done in regard to making contracts for Furnace Coke for next year, but it is pretty safe to say that the price of Furnace Coke for first half of 1903 will not be below $3 a ton, and it may be higher. The Coke business is certainly in a very prosperous condition from the standpoint of profits, the only drawback being shortage in motive power and cars. However, the situation in this respect last week was better than for some time and the hope is expressed that the worst of the trouble is over.

The Carnegie Steel Company, American Steel Hoop Company and the National Steel Company have established joint offices in the Security Building, New Orleans, La., with John R. Scott as manager of sales. This office will cover Texas, Louisiana, Mississippi, Alabama south of Montgomery and Arkansas south of Little Rock. The New Orleans territory had been covered heretofore by the St. Louis, Mo., and Atlanta, Ga., offices. Mr. Scott was formerly assistant to W. J. Totten, manager of sales of the Carnegie Steel Company in St. Louis, and was at one time agent of the American Steel Hoop Company at St. Louis. F. W. Highberger of the Carnegie Steel Company has been appointed sales agent of the company in the City of Mexico. W. B. Weston, whom he succeeds, will become assistant manager of the sales department in St. Louis.

The New York Machinery Market.

NEW YORK, September 24, 1902.

These are busy days for the machine tool trade. Not only is the general demand brisk, but there is now a greater number of good big lists in the hands of machinery men for estimates or in preparation by purchasers than the trade have had to cope with for many months. We have mentioned several of these lists in recent issues. Just at present another and heavier one is commanding attention. It was issued by the Baldwin Locomotive Works of Philadelphia. Conservative estimates place the value of the tools specified as upward of $200,000. While there are a few big tools on the list, it is composed principally of medium sized and the smaller standard tools. The machinery is for delivery in Philadelphia. The Baldwin Company are anxious of closing the matter as quickly as possible. Prompt delivery is desired and it is thought that this matter will figure most essentially in the purchasing of the tools. Some of the items may have been closed on already, as a number of representatives of prominent machinery houses in this city and vicinity were in Philadelphia yesterday with a view of closing on as much as possible.

The entire General Electric list is now out. It consists of some 30 pages of typewritten specifications. All of the leading machinery merchants and such machine tool builders who are not represented in New York are figuring on it. This is another case of "quick delivery counts." The work on the building to be devoted to the building of turbines, for which work the tools are required, is being pushed as rapidly as possible. In fact this is the chief problem with which the company are now wrestling. No effort will be spared to get the new shop in operation as readily as possible, as instances are already cropping up where prospective generator purchasers are holding off until they can see what can be done in the way of turbine sets. The demand for direct current generating apparatus is, however, so great that orders are coming in volumes beyond the capacity of the Schenectady works. A representative of the General Electric Company informed us that some orders for machinery have already been placed, but in the trade it is said that almost the entire list is still undecided upon.

No awards have been made as yet in connection with the Watertown Arsenal job, which, as noted in last week's issue of *The Iron Age*, runs in lots of 20 machines of each type specified.

As to the machinery required for the Portsmouth Navy Yard, bids for which were opened on September 9, no awards have been made as yet.

Purchases are to be made immediately on some $60,000 worth of machine tools by the Standard Plunger Elevator Company, recently organized at $6,000,000 capital. Very much heavier purchases are soon to follow. Offices will be leased at 1 Broadway by the new company. William H. Woodin of the American Car & Foundry Company, 25 Broad street, New York, is the president of the concern. John Sherman Hoyt of 1 Broadway is the vice-president and treasurer and Frederick A. Jones is the secretary. It is intended to erect a factory at Worcester, Mass., immediately. This is to be the largest elevator plant in the world eventually. Other plants will be built in various sections of the country, Secretary Jones now being on a tour of inspection preparatory to the selection of the sites. It is for the Worcester plant that the machinery now to be purchased is wanted. The company have purchased the patents of Frederick H. Jones, Thurrie Larson and others, and will build a new type of plunger elevator adapted to tall buildings. The patents also include a special type of drilling apparatus, which permits the sinking of a steel jacket to a great depth below the foundations of the building. Great things are expected of the elevator, and the company are preparing to meet a very extensive demand. Orders have already been booked for over $500,000 worth of work. Among which are a plant for the new Stratford-Bellevue Hotel of Philadelphia, owned by George Bolt of the Waldorf-Astoria, and Mr. Bolt's new house at the Thousand Islands; the hydraulic dumb waiter system of the Ansonia Apartment Hotel, New York, where the cars are to run 1000 feet per minute and stop automatically at any floor; the passenger elevator plant of the Ansonia, where a guarantee is given to run 16 elevators and light dumb waiters for one year at a cost not to exceed $1500 for steam and not over $10 a year for cost of repairs on each dumb waiter or elevator.

Machinery builders in the East are manifesting considerable interest in the National Machine Tool Builders' Association, which was formed at Niagara Falls and is to hold a convention at Cleveland on October 14 and 15. The results obtained thus far in the shape of better prices as a result of the concerted action taken by the members of this asssociation have been very satisfactory. There will doubtless be a large delegation of Eastern machinery men at the convention next month to discuss matters with their Western associates.

C. B. Carter, secretary and treasurer of the Southern Supply and Machinery Dealers' Association, has announced the programme for the convention to be held at Memphis

on October 21, 22 and 23. Among the topics to be discussed are the following:

"How Can Manufacturers Most Economically Distribute Their Product?"

"Reciprocity."

"Advantages and Disadvantages of Quantity Prices."

"Outlook for the Approaching Year. Will Present Range of Prices Probably Prevail?"

"The Effects of Prices on Consumption."

"What Practical Measures Can We Adopt to Make the Conduct of Our Business More Profitable and How is the Best Way to Do It?"

"Free Delivery."

"Case and Cartage."

"Unfair Business Methods."

"Importance of Local Associations."

Various forms of entertainment are to be provided for the delegates, and special arrangements have been made for the entertainment of the ladies.

It is expected that fully 100 members of the association will be present.

Mr. Carter's address is 117 Gay street, Knoxville, Tenn.

There has been some talk of forming a corporation for the purpose of maintaining a standard price for cutting dies. At the present time the die business is badly cut up in the East, and for the past two or three years manufacturers generally have made no profit. There is but a limited amount of die business done in this country, and over one-half of this is done in New England. In some cities there are located several concerns who are now doing business. The idea is to have the business concentrated in these places so that a large operating expense may be done away with. It is believed that materials can be purchased in large quantities and thereby quite a saving made. It is not the intention to advance prices above the average price paid for goods to-day, but it is the intention to make this price uniform. Nor is it intended to throw out of employment any die makers now employed by the several concerns. It is believed that by making certain lines of dies in certain shops and keeping the workmen always on this same style of work that they will be able to accomplish more than they now do by working first on one kind of a die and then another and their work less laborious. That the quality of the work will be much improved, as workmanship will be the only consideration of the user of dies when placing his order. Manufacturers generally are in favor of such a move, but as yet there has been nothing of a definite character done. From present indications the negotiations now under way will be carried out. In some localities the impression is abroad that some machine company are behind this movement. We are advised on good authority that there is no one interested in this movement in any way, manner or form, either directly or indiectly, except the die manufacturers.

We are advised by James C. Hemphill that the firm of Rogers & Hemphill Machine Company, of Alfred, N. Y., manufacturers of vertical boring and turning mills, have been dissolved by mutual consent, Mr. Rogers having purchased Mr. Hemphill's interest in the business.

Probably the largest order for medium sized engines ever placed in this market was awarded last week by the White Mountain Paper Company of Portsmouth, N. H. It called for 18 engines of various sizes ranging from 1500 to 150 horse-power and went to Hooven, Owens & Rentschler of 39 Cortlandt street, who build the "Hamilton-Corliss" engine. The amount of the contract is said to be close to $200,000. Following is the list of the engines included in the sale: Three 1500 horse-power cross compound, two 1200 horse-power tandem compound, one 500 horse-power tandem compound, one 750 horse-power cross compound, one 400 horse-power cross compound, five 300 horse-power single cylinder, four 250 horse-power single cylinder, one 150 horse-power single cylinder. The engine order in connection with the new plant of the Washington & Annapolis Electric Railway Company of Washington, D. C., also went to Hooven, Owens & Rentschler. The contract calls for three 1500 horse-power cross compound condensing units. It will be recalled that the Cleveland Construction Company are in charge of this work.

A new power plant is being installed at the Meadows station of the Pennsylvania Railroad, Jersey City, N. J. The boiler order has just been awarded to the Babcock & Wilcox Company. It calls for 1500 horse-power of water tube boilers. Other large orders just booked by the Babcock & Wilcox Company include 3600 horse-power for the Henry Phipps Central Power plant at Pittsburgh and 1000 horse-power with stokers for the Elyria Iron & Steel Company of Elyria, Ohio.

The National-Acme Mfg. Compay of Cleveland, Ohio, announce the opening of an Eastern office at 510 Arch street, Philadelphia, with L. M. Waite as manager.

Naval Supply Awards.

WASHINGTON, D. C., September 23, 1902.—The Bureau of Supplies and Accounts of the Navy Department has made the following awards for machinery for the Puget Sound Navy Yard on the basis of bids opened on September 9, 1902:

Class 1. Dimension planer, Henshaw, Bulkely & Co., San Francisco, Cal., $1935.

Class 2. Not to be awarded, as none of the bids is based on a machine complying with the specifications.

Class 3. Pony planers, Harron, Rickard & McCone, $924.

Class 4. Planing and joining machine, Henshaw, Bulkely & Co., San Francisco, $470.

Class 5. Four-sided molding machine, American Wood Working Machinery Company, $695.70.

Class 6. Upright molding machine, Harron, Rickard & McCone, $441.

Class 7. Panel raiser, Harron, Rickard & McCone, $395.

Class 8. Wood turning lathe. No award to be made, as no bid is based on furnishing an electrically driven machine.

Class 9. Power feed rod machine, American Wood Working Machinery Company, $465.31.

Class 10. Self feeding circular ripping saw, American Wood Working Machinery Company, $814.15.

Class 11. Circular cutting off saw, Henshaw, Bulkely & Co., San Francisco, Cal., $720.

Class 12. Swinging cutting off saw, Harron, Rickard & McCone, $661.50.

Class 13. Band resawing machine, Henshaw, Bulkely & Co., San Francisco, Cal., $2055.

Class 14. Scroll band sawing machines, American Wood Working Machinery Company, $691.33.

Class 15. Scroll Saw, Henshaw, Bulkely & Co., San Francisco, Cal., $308.

Class 16. Blind stile mortiser and borer, Henshaw, Bulkely & Co., San Francisco, Cal., $470.

Class 17. Vertical and horizontal boring machine, Harron, Rickard & McCone, $444.

Class 18. Box joint machine, Harron, Rickard & McCone, $751.

Class 19. Wood trimmer and stand, Libby Mfg. Company, $137.50.

Class 20. Wood trimmers, American Wood Working Machinery Company, $40.

Class 21. Automatic sharpener, Hallidie, Henshaw, Bulkely & Co., $113.25.

Class 22. Sharpener and gummer, Hallidie, Henshaw, Bulkely & Co., Seattle, Wash., $53.15.

Class 23. Automatic knife grinder, Henshaw, Bulkely & Co., San Francisco, Cal., $325.

Class 24. Metal band saw, Harron, Rickard & McCone, $189.

Class 25. Sensitive drills, Harron, Rickard & McCone, $324.

Class 26. Monitor lathe, 13 inches, Pacific Tool & Supply Company, $450.

Class 27. Upright drill presses, James Clark, Jr., & Co., $660.

Class 28. Buffing lathe, Ransom Mfg. Company, $68.

Class 29. Surface grinder, Pacific Tool & Supply Company, $65.

Class 30. Grinder, Ransom Mfg. Company, $70.

Class 31. Twist drill grinder, Hallidie, Henshaw, Bulkely & Co., Seattle, Wash., $69.40.

Class 32. Center grinder, to either James Clark, Jr., & Co. or Harron, Rickard & McCone, $41.

Class 33. Dry grinder, John Martin & Co., $260.

Class 34. Milling machine, Manning, Maxwell & Moore, $1075.

Class 35. Hydrostatic wheel press, Hallidie, Henshaw, Bulkely & Co., Seattle, Wash., $1660.

Class 36. Exhaust fan, Harron, Rickard & McCone, $17.

Class 37. Monitor lathe, Pacific Tool & Supply Company, $560.

Class 38. Tool room lathe, Hallidie, Henshaw, Bulkely & Co., Seattle, Wash., $467.50.

Class 39. Screw cutting engine lathe, Hallidie, Henshaw, Bulkely & Co., Seattle, Wash., $585.

Class 40. Double bolt cutter, Hallidie, Henshaw, Bulkely & Co., Seattle, Wash., $656.65.

Class 41. Single bolt cutter, Hallidie, Henshaw, Bulkely & Co., Seattle, Wash., $344.50.

Class 42. Cutting off machine, Hallidie, Henshaw, Bulkely Co., Seattle, Wash., $1550.

Class 43. Post drill, Hallidie, Henshaw, Bulkely & Co., $555.

Class 44. Drilling and tapping machine, Hallidie, Henshaw, Bulkely & Co., Seattle, Wash., $485.

Class 45. Double punch and shear, Williams, White & Co., $5955.

Class 46. Steam hammer, Harron, Rickard & McCone, $926.

Class 47. Bolt makers' furnace, Buffalo Forge Company, $45.

Class 48. Paint mills, Charles Ross & Sons Company, $491.

Class 49. Paint mixer, Charles Ross & Sons Company, $645.

Class 50. Putty mixer, Hallidie, Henshaw, Bulkely & Co., Seattle, Wash., $165.

Class 51. 15 horse-power motor, John Martin & Co., $388.

Class 52. 15 horse-power motor, Drew Machinery Company, $989.

Class 53. 15 horse-power motor, Miller, Thornburgh & Co., $510.04.

Class 54. 12 horse-power motor, John Martin & Co., $458.

Class 55. 10 horse-power motor, Robbins & Meyers Company, $355.30.

Class 56. 10 horse-power motor, John Martin & Co., $444.
Class 57. 10 horse-power motor, Robbins & Meyers Company, $355.30.
Class 58. 7½ horse-power motor, General Incandescent Arc Light Company, $315.
Class 59. 6 horse-power motor. It is recommended that this class be canceled and no award made, as the wording of the specifications makes the requirements of this motor entirely indefinite, and the bids received are too dissimilar for satisfactory comparison.
Class 60. 5 horse-power motor, John Martin & Co., $291.
Class 61. 5 horse-power motor, General Electric Company, $266.
Class 62. 5 horse-power motor, General Electric Company, $265.
Class 63. 5 horse-power motor, General Electric Company, $266.
Class 64. 3 horse-power motor, General Electric Company, $202.
Class 65. 3 horse-power motor, General Electric Company, $202.
Class 66. 3 horse-power motor, General Electric Company, $202.
Class 67. 3 horse-power motor, General Electric Company, $202.
Class 68. 2 horse-power motor, John Martin & Co., $161.
Class 69. Shafting, Manhattan Supply Company, $77.
Class 70. Sheet iron, Alonzo A. Watkins, $3627.18.
Class 71. Fire felt, Washington Rubber Company, Incorporated, $2340.
Class 72. Oars, Frederick C. Johnstone, $620.88.

W. L. C.

New York.

NEW YORK, September 24, 1902.

Pig Iron.—No sales of any magnitude are reported to consumers in this immediate vicinity. A good deal of foreign Iron is being taken right along to meet immediate requirements, but we cannot learn that importers or consumers have placed any orders for large lots lately. There is some inquiry for Low Phosphorus Pig which may lead to business. For delivery in 1903 the following quotations are made: Northern Iron, at tidewater, No. 1 X, $23.25 to $24.75; No. 2 X, $22 to $22.75; No. 2 Plain, $21 to $21.75. Tennessee and Alabama brands, in New York and vicinity: No. 1 Foundry, $23.25 to $23.50; No. 2 Foundry, $22.25 to $22.50; No. 3 Foundry, $21.50 to $22. We quote foreign Ferromanganese $49, ex-ship.

Steel Rails.—During the past week interest has centered in happenings in the Canadian Rail market. It is understood that the Canadian Pacific Railroad has awarded about 55,000 tons, distributing the order among German and English mills. On the other hand, a mill in this country has captured the 20,000-ton order of the Grand Trunk Railroad. We continue to quote $28, at Eastern mill, for Standard Sections.

Manufactured Iron and Steel.—Considerable business has transpired during the week in bridge work. The leading interest reports having received contracts from the following companies for railroad work for 1903: Union Pacific, 17,000 tons; Chicago & Western Indiana, 4000 tons; Denver & Rio Grande, 3000 tons; Tennessee Construction Company, including one swing span, 2300 tons; Delaware, Lackawanna & Western, 1600 tons. They have also secured the contract for the construction of a large power house at Minneapolis taking 2600 tons, besides a number of smaller jobs over other parts of the country. The general demand for Structural Material is excellent and prospects are as bright as at any previous time. Several large buildings will shortly be placed under contract in this city. Bids are to be received this week on a 3500-ton building to be erected at Broadway and Duane street. Other lines continue active. We quote, at tidewater, as follows, but for small lots and prompt delivery much higher prices are being obtained for Structural Material and for Plates: Beams, Channels and Zees, 2c. to 2.25c.; Angles, 2c. to 2.25c.; Tees, 2c. to 2.25c.; Bulb Angles and Deck Beams, 2.10c. to 2.25c. Sheared Steel Plates are 2c. to 2.10c. for Tank, 2.10c. to 2.20c. for Flange, 2.25c. to 2.40c. for Fire Box. Refined Bars are 1.95c. to 2c.; Soft Steel Bars, 1.95c. to 2.10c.

Old Material.—Although importations are being made of some classes of Old Material, particularly Rails and Heavy Melting Scrap, the demand in this immediate vicinity is not specially active. Lots are offering at fair prices, which are not being snapped up as expected. Iron Scrap is hardly so firm as it was recently. Quotations are as follows, per gross ton, f.o.b. cars, in this vicinity:

Old Iron Rails	$22.50 to $24.00
Old Steel Rails, long lengths	22.00 to 23.00
Old Steel Rails, short pieces	19.50 to 20.00
Relaying Rails, heavy sections	28.00 to 30.00
Relaying Rails, lighter sections	34.00 to 35.00
Old Car Wheels	19.00 to 20.00
Old Iron Car Axles	27.00 to 28.00
Old Steel Car Axles	27.00 to 28.00
Heavy Melting Steel Scrap	19.50 to 20.00
No. 1 Railroad Wrought Scrap Iron	23.00 to 24.00
Track Scrap	20.00 to 21.00
Busheling Scrap	15.00 to 16.00
No. 1 Machinery Cast Scrap	18.00 to 19.00
Stove Plate	12.00 to 13.00
Wrought Turnings, delivered at mill	16.50 to 17.50
Cast Borings, delivered at mill	10.50 to 11.00

Metal Market.

NEW YORK, September 24, 1902.

Pig Tin.—Throughout the entire week the market has declined steadily owing to heavy offerings of spot and nearby delivery. Demand was very light, and indications from all sides point to the fact that consumption has fallen off considerably. This falling off, it is said, is due to the unfavorable conditions prevailing in the Tin Plate trade. Yesterday there was a sale of spot Tin at 26c., but since then there have been no transactions, and the price has declined. At the close to-day the following quotations prevailed: Spot, 25.80c. to 29.50c.; September, 25.70c. to 25.80c.; October, 25.60c. to 25.70c.; November, 25.40c. to 25.50c.; December, 25.30c. to 25.35c. In the London market the same condition obtained as in this market, and spot declined sharply yesterday, reaching £119, but to-day went still further, the closing quotations being as follows: Spot, £118 12s. 6d.; Futures, £116 10s. Thus far this month the arrivals have aggregated 2933 tons, and about 2769 tons are afloat.

Copper.—The market is extremely dull and buying for home consumption is on the smallest scale. Consumption has evidently fallen off somewhat this month. Export demand is light and at prices as low as those prevailing before the recent boom. Closing prices to-day were as follows: Lake, 11.60c. to 11.75c.; Electrolytic, 11.40c. to 11.50c.; Casting, 11.40c. to 11.50c.; Standard, 10.75c., nominal. All these quotations are for spot to December delivery. The London spot market has declined 2 shillings 6 pence since last week, closing £52 3s. 9d. Futures are quoted £52 7s. 6d. Best Selected has also experienced a sharp decline and is quoted £55 15s. Exports so far this month amount to 8325 tons. The imports this month have been very heavy and thus far amount to 3327 tons, the most of which came from London and Mexico. The fact that large quantities are being received from London is looked upon with significance in the trade, especially as there are many reports being sent out from London regarding the decrease in local supplies.

Pig Lead.—The market is absolutely without change here, the Smelting & Refining Company still quoting 4.12½c. for spot Desilverized and 4.10c. for futures. The London market has declined a shade, being quoted £10 17s. 6d.

Spelter.—In the West the market has accumulated strength and prices advanced. In this market the efforts of those in control of the situation have not been so successful and prices remain about the same as they were last week. The arrivals here have been a little heavier and this metal was sold at from 5.30c. to 5.40c. The St. Louis market is 5.25c. Demand here is said to be very light. The London market has declined 7 shillings 6 pence and is quoted to-day £19.

Antimony—Is lower. Hallett's is quoted 7¾c. and Cookson's 10c., while other brands have declined to 7½c.

Nickel.—No change is noted. Large quantities down to ton lots are now quoted at 40c. to 47c. per lb., according to size and term of order. Smaller lots are quoted as high as 60c., according to quantity.

Quicksilver.—The market is quiet and unchanged, the ruling quotations being $48 per flask of 76½ lbs., each in lots of 50 flasks or more. London is unchanged at £8 15s.

Tin Plates.—The market is dull and uninteresting, with an absence of any important buying. Prices are without change. The American Tin Plate Company are quoting for delivery up to December 1 on the basis of $4.19 per box for Standard 100-lb. Cokes, f.o.b. New York, or $4, f.o.b. Pittsburgh. The market at Swansea declined 1½ pence to 12 shillings 3 pence.

The Passaic Rolling Mill to go to a New Company.—The Passaic Steel Company of Paterson, N. J., have been incorporated under the laws of that State by Albert C. Fairchild, Henry F. Bell and Frederick F. Searing. The object of this corporation is to take over the property and business of the Passaic Rolling Mill Company of Paterson, the well-known manufacturers of structural shapes. This has been under contemplation for some time, and arrangements are now being completed for the transfer, which will occur at some time prior to November 1. The management will continue the same as heretofore, with the exception that President W. O. Fayerweather will voluntarily retire. Mr. Fayerweather's connection with the company began with his purchase of an interest in the corporation 30 years since. He now desires to retire from active business.

Trade Publications.

Die Milling Machines.—We have received from the Thurston Mfg. Company of Providence, R. I., a pamphlet describing their die milling machine. The frame is supported upon trunnions, which hold it in any desired position in order to obtain the best light on the work, which is held in a chuck placed on the frame. The spindle carried by the frame is vertical and adjustable. The cutter projects through an opening in the chuck, and is straight or taper to suit the amount of clearance required in the die. It is only necessary to drill one hole through the die, and the cutter, starting in this hole, removes the entire center in a single piece. The chuck is moved in either direction by means of two slides at right angles to each other, and by the use of a hand wheel the lines laid out on the surface of the work can be accurately followed.

The Renold Silent Chain.—The Renold silent chain gear, manufactured by the Link-Belt Engineering Company of Philadelphia, is described in a catalogue which fully illustrates the applicability of this chain for transmitting power from the motor to the machine. The engravings show the chain applied to drills, boring machines, bending rolls, counter and line shafts, blowers, &c.

Iron and Industrial Stocks.

Last week the market for industrial stocks held its own quite well, but the sharp general decline on the Stock Exchange which began on Tuesday had its effect on the values of iron and steel stocks and some low figures were made yesterday and to-day. There has been little news regarding any of the properties.

Dividends.—The Westinghouse Electric & Mfg. Company of Pittsburgh have declared a regular quarterly dividend of 1¾ per cent. on the first preferred stock, payable October 1.

The La Belle Iron Works.—The annual meeting of the stockholders of the La Belle Iron Works of Steubenville, Ohio, was held in Wheeling, W. Va., recently. The annual statement for the year ending July was read and the showing was very satisfactory. For the information of the stockholders, J. E. Wright, president, read a detailed statement of the progress made in the improvements of the Steubenville plant, now nearing completion. Among other information contained therein was that the blooming mill would be in operation this month, and that they would then be rolling their own steel, relieving a condition which has seriously handicapped the management and prevented the mill from producing far better results. The president also stated that they hoped to have the new blast furnace in operation by the first of the year, which would practically complete the plant and, including ore and coal territory, make it in nearly every particular up to date and independent of other concerns. The old Board of Directors was re-elected, as were also the officials, consisting of J. E. Wright, president; A. J. Clarke, vice-president; W. E. Beswick, secretary, and W. B. Higgins, assistant secretary.

Standard Bolt & Mfg. Company.—The Standard Bolt & Mfg. Company have about completed their new plant at Alliance, Ohio. They will manufacture machine bolts of all standard sizes from ⅝ inch to 2½ inches, as well as track bolts, nuts and boiler and structural rivets. Their plant is new throughout, the main building being 208 x 70 feet, with brick boiler house 34 feet square, also building for gas plant, all of brick, stone and glass, with slate roofs. The equipment of the plant is thoroughly modern. The bolt, nut and rivet machines were furnished by the Acme Machinery Company of Cleveland, Ohio; engine and boiler by Brownell & Co., Dayton, Ohio; planers, lathe and drills for the machine shop were purchased through the Cleveland agency of Manning, Maxwell & Moore. For fuel for bolt and rivet furnaces the company have installed a complete gas plant built by the Acme Gas Company, Chicago, Ill.

The two new blast furnaces which are being erected at the Edgar Thomson Steel Works of the Carnegie Steel Company are expected to blow in during December. Work was started in April so that their completion will be effected in remarkably rapid time.

The Tin Plate Situation.

PITTSBURGH, PA., September 24, 1902.—A conference has been arranged between the Tin Plate Wage Committee of the Amalgamated Association and the American Tin Plate Company, to be held in New York on Monday, September 29. At this meeting the vote of the lodges on the matter of accepting a reduction when working on tin plate for export will be definitely known. The first vote of the lodges taken some time ago was almost unanimously against accepting the proposition, but owing to the appeals of President Schaffer and other officials of the Amalgamated Association, together with other influences that were brought to bear, many of the lodges that voted at first against the reduction have since voted in favor of accepting it, and it now looks as though enough lodges will vote in favor of the proposition to carry it. The American Tin Plate Company will be represented at the conference by Warner Leeds and the various district managers.

Large Orders for Engines.—The Mesta Machine Company, Lewis Block, Pittsburgh, have received an order from the Tennessee Coal & Iron Company for a pair of 55 x 66 inch direct coupled piston valve reversing engines. These engines will be of very heavy design and are to replace the engines now driving the 44-inch blooming mill in the Ensley steel plant of the Tennessee Coal & Iron Company at Ensley, Ala. The Mesta Machine Company have also received an order from the same concern for four blowing engines with steam cylinders 44 x 60 inches and air cylinders 84 x 60 inches. These are to replace old engines in the blast furnaces of the Tennessee Coal & Iron Company at Ensley.

The Orient Coal & Coke Company.—Julian Kennedy of Pittsburgh and Rogers, Brown & Co. of Cincinnati have bought 1150 acres of land in Red Stone township, Fayette County, Pa., and have organized the Orient Coal & Coke Company, with an authorized capital of $2,000,000. The tract lies just east of the synclinal line of the Klondyke coke district and adjoins the property of the Brier Hill Company and is estimated to contain 10,000,000 tons of coal. About $500,000 will be spent in development in the sinking of a shaft, the building of houses and the erection of 300 coke ovens. The company expects to ship about 1000 tons of coal per day, and the product of 300 to 400 coke ovens, for the general market. The requirements of the furnaces which Rogers, Brown & Co. control have already been provided for.

For some time negotiations have been under way looking toward the consolidation of the Ryan-Whitney-Guggenheim and National Lead Company white lead interests. It is now reported that an effort is being made by the former interests to acquire control of the National Company, by purchasing their stock in the open market. A large amount of the common stock is said to have been secured already. President Cole of the National Lead Company said that the negotiations are "all in the air."

Prosperity Lodge of the Amalgamated Association, composed of employees of the La Belle Works of the American Tin Plate Company, of Wheeling, W. Va., have voted in favor of accepting a reduction of wages when working on tin plate for export. A former vote of this lodge was against this proposition.

The Helmbacher Forge & Rolling Mill Company, St. Louis, Mo., have increased their capital stock from $300,000 to $500,000. The company have secured a rolling mill plant in Madison, Ill., which they expect to have in operation within a few weeks.

In August the Pressed Steel Car Company of Pittsburgh turned out 2730 cars, an average daily output of 105 cars for every working day during the month. This is the largest output of cars in any one month in the history of this plant.

Eastern Pennsylvania Industrial News.

HARRISBURG, PA., September 23, 1902.—The managers of Eastern Pennsylvania works and furnaces are awaiting the end of the coal strike and when relief comes there will be a great resumption of operations among plants now idle or running on reduced time because of the trouble to secure fuel. With the settlement of the strike it is expected that the difficulties about iron and steel supplies will be overcome to a great extent. The question of material is greater than that of fuel just now. English and Scotch pig irons are being delivered to almost every plant of any size in Dauphin, York, Lancaster, Berks and Lebanon counties, excepting those having their own furnaces, and some of those works are compelled to buy abroad. Many hundreds of tons of steel are being imported, although the tonnage of open hearth steel is increasing in this part of the State.

The works which have started operations on improvements, considerably delayed by various causes, are the Central Iron & Steel Company of this city on their open hearth plant; the Susquehanna Iron & Steel Company on their pipe mill at Columbia, where a large force of men is at work, and the American Iron & Steel Mfg. Company at Lebanon, where many extensions are being made. The Lalance & Grosjean tin plate mills in Harrisburg are working on numerous improvements noted early in the summer in *The Iron Age*.

The Lackawanna Steel Company will blow in or start a banked stack in the Lebanon district soon; Lochiel of the Pennsylvania Steel has started; Robesonia was blown in Thursday after two weeks' suspension; the Empire Company will start Macungie and Topton when the strike is settled and Chickies will be blown in shortly, as soon as repairs and alterations can be made.

The Harrisburg Foundry & Machine Works have a new difficulty to contend with. Twelve of their skilled men are on strike service with the Pennsylvania National Guard regiments, which are now in the anthracite region. This circumstance and the lack of fuel have caused more or less delay. The company have lately booked orders for engines as follows: Two 500 horse-power engines for the Jefferson & Clearfield Coal & Iron Company for an electrical plant; a large engine for the Webster Coal & Coke Company; a 300 horse-power engine for the Gould Coupler Company's Cleveland works, and a 250 horse-power engine for the Philadelphia, Wilmington & Baltimore Railroad's electric plant at Anticosta, Md.

Surveys made for the reopening of the old Tidewater Canal from Wrightsville to Havre-de Grace, Md., have caused a boom in a district well known for its iron. A number of strikes of ore have been made in sections in York County near the line of the canal.

The Pennsylvania Steel Company have started the stacks banked last week, the coke supply having slightly improved.

The Duncannon Iron Company have elected these officers: President, Rodman Wister; treasurer, Joseph Jackson; secretary, J. B. Lequear, and George Pennel, manager.

It is said that the Moselem ore mines, in Berks County, will be sold to an Allentown firm at an early date. The mines have been in operation for many years and in the past supplied the old Moselem and other Berks County stacks with ore, the output being the largest in the eastern part of the State.

The Thomas Iron Company officials deny that they will enter the cement business, the Thomas Portland Cement Company being only a similarity in name.

The American Iron & Steel Mfg. Company have started part of their plant at Lebanon, the men returning to work in all but a few mills. E. J. S.

The Canadian Niagara Power Company.—The heading in the tunnel between the wheel pit and portal of the tunnel of the Canadian Niagara Power Company has been broken through, and now it is possible to pass from the wheel pit site to the river below the Horseshoe Falls by means of this underground passage. The work of sinking the shaft for the tunnel work was commenced June 1, 1901. The tunnel has a length of 2200 feet, and will require about 5,000,000 brick to line it. Completed, the tunnel will cost about $650,000. The entire lower bench of the tunnel is yet to be excavated. The hight of the excavation is 28½ feet and the width 24½ feet. When lined, the tunnel will be 25 feet high and 18 feet 9 inches wide. Thus the Canadian tunnel will be 4 feet higher than the big tunnel on the New York side, but it is not so long. The granite to be used at the portal of the Canadian tunnel will be brought from Quebec.

The Tonge Hydraulic Mining Cartridge.—A recent issue of the *Journal of the Society of Arts* gives particulars of the Tonge hydraulic mining cartridge, to which the Council of the society awarded the Benjamin Shaw prize. This cartridge is intended to replace explosives in fiery mines, and is simply an ingenious modification of the ordinary hydraulic press. It consists of a steel cylinder 20 inches long by 3 inches in diameter, along one diameter of which are arranged a series of eight small rams, which are telescopic, so that the available traverse is practically doubled. In using the device, after the coal has been undercut in the usual way a 3¼-inch hole is drilled along the roof line into the coal for a depth of 3 or 4 feet. The cartridge is then pushed into the hole, backed by one or more liners, as may be necessary, under the line of the rams. Water is then forced by hand pumps into the cartridge, and forces out the rams, a pressure of 3 tons per square inch being readily attainable. In about 10 minutes the coal is brought down by the action of the rams, and is obtained in large pieces, the dust and small coal being much less than is the case when explosives are used. In practice, it is stated that one man can make 25 to 30 "thrusts" per shift, or about 150 per week, which will yield about 300 tons of coal, of which 75 per cent. will be large coal. The actual weekly cost of working is practically the same as with ordinary explosives, but the value of the coal obtained is much greater. The apparatus has been in use for two years in different mines. In one of these 19,000 "shots" or "thrusts" have been made by four machines in 12 months, which yielded 40,000 tons of coal. The seam at this mine is made up of 3 feet good coal underlaid by 4 inches of dirt, and another 2 inches of coal. The undercutting is done in part by machine, the depth of cut being 5 feet 9 inches. The cartridge holes are then drilled to a depth of 5 feet, and are spaced 6 feet apart. Where hand holing is used the depth of undercut is 4 feet, and the cartridge holes are made 3 feet 6 inches deep and spaced 7-foot centers. Four men look after the four cartridge machines, one of which is always kept in reserve. These men go round the workings and break down the coal for each miner as soon as the latter has finished his undercutting and drilled his cartridge hole. The use of explosives has been entirely superseded by the machine in these mines.

United States Patents.—The report of the Commissioner of Patents for the year 1901 shows total receipts of $1,449,398 and expenditures of $1,297,385, leaving a balance of $152,012, which goes to a surplus fund already amounting to $5,177,458. At least one department of the Government is self supporting. The total number of applications requiring investigation was 52,912, and the total number of patents issued was 27,292, so that nearly 50 per cent. of the applications was rejected. According to the statistics Connecticut leads in inventive genius, having obtained one patent to every 1198 inhabitants. Then comes District of Columbia with 1296; Massachusetts is next with 1472, and then New Jersey with 1572. North Carolina and Mississippi require over 18,000 citizens to think up one invention, while in South Carolina the number is over 28,000, and in Alaska over 31,000. Of foreign countries Germany comes first, as 1045 of her people took advantage of our patent laws. England is next with 986, then Canada 376, France 306 and Austria 156.

PERSONAL.

Charles M. Schwab, president of the United States Steel Corporation, is a large stockholder in a new company who will build a paper mill at Hollidaysburg, Pa.

W. H. Friese, assistant manager of the Kingman Implement Company of Omaha, Neb., has tendered his resignation to take effect October 1.

George B. Kirkman, sales agent for the American Steel & Wire Company at Cleveland, has been appointed manager of an office at Memphis, Tenn. He will cover Tennessee and Kentucky.

S. T. Wellman of the Wellman-Seaver-Morgan Engineering Company, Cleveland, Ohio, is expected home from Europe at an early date.

E. D Leavitt, Jr., of Cambridgeport, Mass., consulting engineer of the Calumet & Hecla Mining Company, has returned from Europe.

Russell W. Davenport, formerly of the Midvale Steel Company and of the Bethlehem Steel Company, has been elected a director of the Tidewater Steel Company of Chester, Pa.

The eightieth birthday of John Fritz of South Bethlehem, Pa., is to be celebrated by a dinner to be given in his honor at the Waldorf-Astoria, New York, on October 31. This banquet will also signalize the successful founding of the John Fritz gold medal for achievement in the industrial sciences, the medal to be awarded annually by a committee of members of the American Society of Civil Engineers, the American Institute of Mining Engineers, the American Society of Mechanical Engineers and the American Institute of Electrical Engineers.

R. L. Newman, formerly with the Cramps, the Globe Iron Works of Cleveland and general superintendent of the New York Shipbuilding Company of Camden, has opened offices as consulting engineer and naval architect in the Chesebrough Building, New York. Mr. Newman will also develop full systems for marine and local purposes under the patents of the International Oil Fuel Construction Company of New York.

J. B. Nau has resigned as superintendent of the New York Steel & Wire Company of Astoria, N. Y.

Pittsburgh friends of Charles M. Schwab, president of the United States Steel Corporation, have received private advices from Paris, France, that Mr. Schwab's health is greatly improved. His chief trouble is said to have been acute indigestion.

George D. Wick, formerly president of the Youngstown Iron Sheet & Tube Company, at Youngstown, but who resigned before going to Europe, about three months ago, will probably spend the winter in the southern part of France or in Southern California.

OBITUARY.

CHARLES H. LATROBE, a well known civil engineer, who planned many of the public works and improvements in Baltimore, died on September 21, in that city. Some years ago Mr. Latrobe went to Peru and superintended the construction of several bridges in that country, including the Arequipa viaduct, 1300 feet long and 65 feet high, and the Ague de Verrugas bridge, 575 feet long and 263 feet high.

OTIS H. BURTIS, a prominent stove manufacturer of Troy, N. Y., and head of the firm of Burtis & Co., died on September 10 at his home in that city, aged 58 years.

EMILE BARBAROUX, head of the firm of Barbaroux & Co., dealers in heavy machinery, of Louisville, Ky., died on September 9 at his home in that city, aged 80 years. He was born in Philadelphia, but had lived in Louisville from childhood. He started in the iron business in that city under the firm name of Barbaroux & Snowden, the concern later becoming Barbaroux & Co. Mr. Barbaroux was actively connected with the business up till last July, when he was attacked with the illness that caused his death.

ALBERT F. PRENTICE, formerly vice-president of the Prentice Brothers Company, Worcester, Mass., and a large stockholder in the concern, died on Septemebr 14 at his home in that city, aged 61 years, after a prolonged illness. He was born in Worcester and passed his life there. After some years of apprenticeship in the machinist and foundry trades Mr. Prentice joined his brother, Vernon F., in the tool making business under the firm name of A. F. Prentice & Co. Vernon F. Prentice subsequently sold his interest to his brother, who eventually disposed of it to F. E. Reed and became superintendent of the Cleveland Machine Company of Worcester. In 1872 the brothers again formed a partnership under the name of Prentice Brothers, which has become the large machine tool concern now in operation.

The Coming of the Steam Turbine.

Commenting upon the turbine the *Electrical World* says: We are watching and noting with the keenest interest the performance of the steam turbine plants installed in increasing numbers. Thus far the reports received have been of a highly encouraging character, but lacking in that detail which is necessary for reaching final conclusions. While the tests as a rule show a degree of economy fully up to the standard of the compound condensing engine, few installations have been in operation long enough to show what difficulties, if any, will crop out after extended trial. So far as electrical uses go the turbine has the advantage of high rotative speed, thus giving to the dynamo relatively low cost and high efficiency, since speed is certainly the cheapest way of getting electromotive force. A test based on steam per kilowatt hour at the bus-bars shows the turbine in a particularly favorable light, and whatever its place in general manufacturing may prove to be it has a strong claim for favor in electrical power stations. Some of the economic results reported are of a most startling character for machines of moderate capacity. Much of the future of the turbine, however, depends on its performance in rather small and in very large sizes, and here the data are as yet rather incomplete. What, for instance, can be expected from a 10-kw. turbo-generator and from a 2500-kw. one in fair comparison with the best reciprocating engines of similar capacity? As to the former case, the turbine ought by good rights to have a material advantage, since small engines, even the best of them, are notoriously uneconomical; but the latter condition is less to the turbine's advantage. And since the work of the future will include plants of truly gigantic dimensions, the performance of big turbines is of the greatest importance. It may be that in turbine practice the effect of linear dimensions upon economy may show some interesting peculiarities. Just at the present time the public are rather in the dark about turbine performances, as they are going through the stage of exploitation which is conducive to secretiveness—a policy often necessarily adopted by the manufacturer, but a bit vexatious to the would be buyer.

John Wales Wire Company.—The John Wales Wire Company of Auburn, R. I., manufacturers of wire rods, wire and wire nails, have completed their new offices at Auburn, R. I., and have discontinued their Boston agency, the office force having consolidated with the works at Auburn, R. I.

The Central Plow Steel Company are holding a meeting to vote upon the feasibility of continuing in business. The company have been marketing the soft center steel output of the Crucible Steel Company, and also the independent manufacturers that produce the same material. The stock of the company is owned by the old manufacturers of soft center steel.

Frank H. Goodyear, G. M. Sicard, W. A. Rogers, Wilson F. Bissell and John H. Lascelles of Buffalo, connected with the Buffalo-Susquehanna Iron Company, are the directors of the Buffalo & Susquehanna Railway Company, who are to operate an 85-mile railroad from Wellsville to Buffalo.

HARDWARE.

WHILE it is necessary for the manufacturer to know the cost of producing his goods in order that he may be intelligently informed, in regard to the prices at which they should be marketed, it is almost as important for the merchant to know the cost of doing business—that is, the ratio which the expense of conducting the business bears to the total sales. Statements are frequently made in an offhand way of a retail or wholesale business being done at a surprisingly small percentage of cost, when if the matter were investigated it would probably be found that several items of expense had been omitted, and that the actual percentage of expense was much higher than supposed. In any calculation of this character it is evident in order to be on the safe side that the salaries of the partners should be included, as well as interest on capital invested, and all clerk hire, commissions, rent, insurance, heating, lighting, advertising, traveling, postage and office expense, breakage and repairs, as well as all material used in the store, such as Paper, Twine, &c., and that the important items of freight and cartage should also be changed up. unless, as many prefer to do, they have been added to the cost of the goods. In short, the expense of doing business covers every cent paid out except the cost of the merchandise. When the cost of doing business is thus determined the information acquired will be found of use in many directions in connection with the marking of prices and the management of the business. It is fundamentally important that the merchant should not attempt to deceive himself by supposing that it costs him less to market his wares than is actually the case. Nothing is gained by making the expense bear too high a proportion to the total sales, but a mistake in this direction is apt to be less mischievous than underestimating it.

As a result of changes which are taking place in the character of goods produced and in the method of their production and distribution, there are, fortunately for the Hardware merchant, more gains than losses. While some things have drifted into other channels, or practically disappeared from the market, many other articles and lines have appeared in the Hardware field and offer themselves to the enterprising merchant as suitable for a place in his store. Among these relatively recent accessions is the line of Mixed Paints, which in a peculiar manner belong to the Hardwareman with much more propriety than to any other class of merchants. They are obviously closely related to the Hardware stock, and the manner in which they are put up makes them not only convenient to handle, but attractive to display. That they yield a good margin of profit is another consideration which is not without force when the sale of so many kinds of goods is on account of sharp competition attended with comparatively little profit. The conditions which exist in localities will, of course, have much to do with determining the wisdom of Hardware merchants taking up the sale of Paints, but there is little doubt that as a general principle Paints, where circumstances do not justify the maintenance of stores devoted exclusively to their sale, belong to the Hardware merchant. The tendency is certainly in that direction, and the success which has attended the efforts of those in this field who have taken them up is a strong argument for the consideration by other merchants of the claims of this class of products, which should be treated not so much as a side line, but as a part of the regular stock.

Condition of Trade.

The market reflects the advancing season, and demands for fall and winter goods are coming in more frequently and more urgently. This class of wares at the present time demands a larger degree of attention than miscellaneous lines, which, however, continue to move in fair volume. The jobbing trade are not just now placing heavy orders and are apparently sufficiently covered with the goods in stock and by orders in process of execution. There is no disposition to buy speculatively, and merchants as a rule are acting very conservatively. Manufacturers report less difficulty than some time ago in obtaining raw material, except pig iron, the scarcity of which causes much inconvenience and delay. Manufacturers generally are full of business, but some of them are more desirous of booking orders than has of late been the case. Production is going on at a great pace, but the character of the demand and consumption is such as to absorb the output of factories with little difficulty except in a few lines, principally those in which new competition has been developed by consolidations or combinations. The Shovel situation, for example, is getting decidedly unsatisfactory. In some heavy lines, of which Wire products and Wrought Pipe may be cited as examples, new makers who are in the field or about to enter it promise to subject the market to a test of its strength. Export business shows both gains and losses. In some of the markets American goods of certain lines are having difficulty owing to lower prices of goods made abroad, but in others large and varied quantities of our products are going out.

Chicago.

(By Telegraph.)

The general character of business in Hardware has changed but little during the week, the volume having been quite satisfactory, with large orders from the country trade. There have been reports of further sales of Barb Wire and Wire Nails at lower prices, but these are exceptional transactions, and in the main the market is very well maintained. In all kinds of Heavy Hardware the volume of business has been large, with nearly all articles participating in the activity. Bolts, Washers and Nuts, as well as Bars, Channels, Angles and Plates, have sold well. The Sash Weight market is strong, and it is reported that Steel Goods made by the American Fork & Hoe Company have been marked up about 10 per cent. The active competition in the Shovel trade has reached an interesting stage, with four or five animal brands making strong bids for popularity at relatively lower prices. There has been quite a liberal movement in Screws, but very low prices are said to be current. Enameled Ware, Sad Irons and such other articles have continued in good demand. Builders' Hardware has sold well from stock, but, as natural at this season, there have been few large contracts offered. Prices are well sustained. The movement in fall goods such as previously noted has continued liberal. There is an especially active movement in specialties and Shelf Hardware.

NOTES ON PRICES.

Wire Nails.—A slight improvement is noted in the demand, which is expected to show further activity before long. The volume of business, however, is only moderate, the trade apparently being supplied for the present and perhaps distrustful of the market. There is more or less irregularity in delivered prices quoted in Texas and other points in the South and Southwest, but these are perhaps to some extent connected with the

manipulation of freight rates. Apart from this prices are fairly maintained in the market at large on the basis of the following regular quotations, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

To jobbers in carload lots	$2.05
To jobbers in less than carload lots	2.10
To retailers in carload lots	2.10
To retailers in less than carload lots	2.20

New York.—Local demand keeps up well. Mills are shipping Wire Nails promptly, but carloads from the Pittsburgh district cannot be counted upon to arrive at this point in less than 12 to 15 days, owing to delays in transportation. Quotations are as follows: Single carloads, $2.20; small lots from store, $2.25 to $2.30.

Chicago, by Telegraph.—There has been quite a good demand for Wire Nails, but the market has been somewhat unsettled by reports of concessions granted in special cases. As a rule, however, prices have been at least usually well sustained. There are still some difficulties arising from lower rate made by the railroads, to which reference has been previously made. Sales in carload lots are made mainly at $2.15, and in a jobbing way at $2.20 to $2.35.

Pittsburgh.—While a slight improvement in demand for Wire Nails is reported by a few mills, yet the situation as regards prices seems to be worse than at any time during the summer months. The low prices of Wire Nails that are being made for delivery in Texas and other Western and Southern points, seem to have affected the entire market. Mills continue to allow a rebate of 5 cents per keg for carload orders, and it is said that in special cases a larger rebate has been allowed. Quotations continue on the basis of $2.05, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days.

Cut Nails.—The market is firm, but owing to the scarcity of steel and delays in transportation prompt delivery from mill is exceptional. Iron Cut Nails continue scarce. Quotations are as follows: $2.05, base, in carloads, and $2.10 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination; terms 60 days, less 2 per cent. off in 10 days.

New York.—The condition of the local market shows no change. Demand continues in about the usual proportion to Wire Nails. Quotations for carloads and less than carloads are as follows:

Carloads on dock	$2.18
Less than carloads on dock	2.23
Small lots from store	2.30

Chicago, by Telegraph.—The supply of Iron Cut Nails is light, and the market is very firm. Steel Cut Nails are selling moderately well and the market is steady. Carload lots are quoted at $2.20, base, and less than carload lots at 5 cents more from store.

Pittsburgh.—There is a fair demand for Steel Nails and a continued scarcity of Iron Cut Nails, which bring higher prices than Steel. We quote Steel Cut Nails at $2.05, base, in carloads and $2.10 in less than carloads, plus freight in Tube Rate Book to point of destination; terms 60 days, less 2 per cent. off in 10 days.

Barb Wire.—Because of the slow movement of Barb Wire and the character of existing competition the market lacks strength. Mills are reported as allowing a rebate of 5 cents per 100 pounds to jobbers in carload lots and over. Some jobbers are also making slight concessions in price. Low prices, too, have been quoted in Texas and other Southwestern points. Regular quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. off for cash in 10 days:

	Painted.	Galv.
To jobbers in carload lots	$2.60	$2.90
To jobbers in less than carload lots	2.65	2.95
To retailers in carload lots	2.70	3.00
To retailers in less than carload lots	2.80	3.10

Chicago, by Telegraph.—There has been a fair movement, and reports of lower prices have caused a slightly unsettled feeling. Such transactions, however, if any, have been the exception, rather than the rule, prices being well sustained for Galvanized at $3 to $3.05, and Painted at $2.70 to $2.75, in carload lots, with 5 cents extra for small quantities from store.

Pittsburgh.—The market is very dull and the unevenness in prices repeatedly referred to in this report is more pronounced than for some time. It is stated that very low figures are being made on Barb Wire for shipment to certain Western and Southern points. A rebate of 5 cents per 100 pounds is allowed for carloads. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days: Painted, $2.60; Galvanized, $2.90; less than carload lots, Painted, $2.65; Galvanized, $2.95.

Plain Wire.—The demand is fair, but not equal to the productive capacity of the mills. Prices generally are fairly well maintained, but lower delivered prices in Texas and the Southwest are being quoted, perhaps as the result of concession obtained in freights. Regular quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. for cash in 10 days:

Base sizes.	Plain.	Galv.
To jobbers in carload lots	$2.00	$2.40
To jobbers in less than carload lots	2.05	2.45
To retailers in carload lots	2.05	2.45
To retailers in less than carload lots	2.15	2.60

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

6 to 9	Base				$0.40	extra.
10	$0.05	advance	over	base	.40	"
11	.10	"	"	"	.40	"
12 and 12½	.15	"	"	"	.40	"
13	.25	"	"	"	.40	"
14	.35	"	"	"	.40	"
15	.45	"	"	"	.75	"
16	.55	"	"	"	.75	"
17	.70	"	"	"	1.00	"
18	.85	"	"	"	1.00	"

For even weight bundles, 50 pounds and over, 5 cents per bundle advance on above.

Chicago, by Telegraph.—The order trade has been of moderate proportions, but the market has remained steady at $2.10 to $2.15 for carload lots on track and $2.20 for jobbing lots from store.

Pittsburgh.—Demand is altogether for small lots, and the tone of the market is not firm by any means. Mills continue to allow a rebate of 5 cents per 100 pounds on carloads. We quote Plain Wire at $2, base, and Galvanized at $2.40 in carloads, f.o.b. at mill, subject to above rebate.

Cordage.—The Rope market cannot be called active, although there is a continual movement of small lots. Manufacturers are also making shipments of Sisal Rope on contracts placed at the low price ruling two or three weeks ago. Oil Well Cordage and Transmission Rope, which are both made of Manila fiber, are in good demand. Mixed Ropes and substitutes are largely ordered in place of Sisal and Manila, owing to high prices. Quotations range, on the basis of 7-16-inch and larger, from 9½ to 10 cents for Sisal and from 12½ to 13 cents for Manila Rope.

Cradles and Snaths.—The manufacturers of Cradles and Snaths have recently been determining prices for next season, which to the general trade are as follows:

	Discount.
Snaths	45 and 5 %
Cradles	50 %

Steel Goods.—The trade have not as yet received the quotations of the American Hoe & Fork Company, the consolidation of manufacturers in this line. It is understood that with something of a revision of base prices extra discounts will be announced somewhat less than those which were given during the past season. It is believed to be the intention of the manufacturers to move conservatively in the matter of prices and not to make too much of an advance. The increased cost of manufacture, however, requires the announcement of higher prices than have been current.

Dripping Pans.—The market for Dripping Pans is decidedly firm, and some of the manufacturers have recently announced somewhat higher prices.

Glass.—Owing to difference of opinion as to the future policy of the Independent Glass Company, it was

decided at a meeting held last week to liquidate and go out of business after making Glass to fill uncompleted orders. This, it is supposed, will require about two months. The independent factories are scheduled to start operations about October 4. The dissolution of the Independent Company introduces new and unexpected conditions into the Glass situation. By some it is expected that quite a number of the firms which have been in the Independent Glass Company will join the Federation Company, while others are of the opinion a limited proportion are likely to affiliate themselves with the newly organized combine. It may be that those who stay outside of the combines will find it more profitable to maintain quotations made by the latter than to cut prices. The start of the American and Federation companies on October 15 will depend upon whether a wage scale is arranged by that time. Stocks are generally light, but buyers are holding off until the future of the Glass market becomes more definite. The Jobbers' Association quotations are as follows for single and double strength Glass:

	Discount.
From store	88 and 5 %
F.o.b. factory, carload lots	89 and 5 %

Paints and Colors.—*Leads.*—The demand for White Lead in Oil is good for prompt shipment, and also for future delivery covering the coming six weeks. Quotations are as follows: In lots of 500 pounds or over, 6 cents per pound; in lots of less than 500 pounds, 6½ cents per pound.

Oils.—*Linseed Oil.*—On September 20 the price of City Raw Oil was reduced 2 cents per gallon by the manufacturers, resulting in quotations of 55 cents in lots of five barrels or more and 56 cents per gallon in lots of less than five barrels. State and Western Oil is selling at from 50 to 53 cents in lots of five barrels or more, according to the buyer. The demand is active for small lots of Oil, as stocks are low, buyers not caring to make contracts for future delivery with lower prices expected. Stocks in manufacturers' hands are low, as they have not anticipated their requirements for seed to any extent on the falling market. It is probable that their entire output for the next month will be required to supply the hand to mouth demand. Present prices will possibly rule for Oil until there is a further decline in seed values.

Spirits Turpentine.—The market at this point has shown additional strength during the week with advancing prices. This has had a tendency to restrict buying, which has been confined to small lots. The situation is strong both at this point and in the South, owing to the expected increase in domestic requirements next month. Quotations, according to quantity, are as follows: Southerns, 49 to 49½ cents; machine made barrels, 49½ to 50 cents per gallon.

AMERICAN CYCLE MFG. COMPANY RECEIVERS.

THE AMERICAN CYCLE MFG. COMPANY, incorporated under the laws of New Jersey in 1901, with principal offices in Chicago, has been placed in the hands of receivers to protect the interests of creditors. It is claimed that there is no question of the company's solvency, but the embarrassments were created through the appointment recently of receivers for the American Bicycle Company and it seemed that the business of the former company might be in jeopardy if it were not placed under the protection of the courts. R. L. Coleman, A. A. Pope and John A. Miller have been appointed receivers, giving bonds for $150,000. According to the statement made the local property of the company is valued at $995,000, merchandise on hand $573,646, bills receivable $149,000, and cash on hand $8000. No statement has yet been filed of the full liabilities. The properties embraced by the American Cycle Mfg. Company in Chicago and the estimated value of each are as follows: Rambler factory and equipment, $300,000; Imperial factory, $220,000; Crescent factory, $325,000; Monarch factory, $150,000. The capital stock of the company is $8,000,000, all of which, with the exception of ten shares, it is stated, is held by the receivers appointed.

CUTS IN WESTERN FREIGHT RATES.

RAILROAD competition for business between Chicago, St. Louis and Denver and Colorado common points, including also much intervening territory in adjacent States, has unsettled business conditions in a portion of the territory governed by the Western classification, and incidentally works much hardship to the Hardware jobbing concerns along and near the Missouri River, including such cities as Sioux City, Omaha, Council Bluffs, Leavenworth, Atchison, Topeka, Wichita and Kansas City.

According to our advices it began some time ago secretly on structural material for a large Denver packing house, extending to mining machinery and eventually involving all of the iron list, fifth class, Western classification, among which are Nails, Bolts and Nuts, Bar and Sheet Iron, Structural Material, &c. The fight so far is confined to carload lots and does not complicate smaller shipments, the cut rates covering only from Chicago and St. Louis territory to Denver, &c.

At first the cutting was done confidentially; now it is an open fight on tariff, the significance of which is that tariffs are open to everybody, as, according to the Interstate Commerce Law, all freight and passenger tariffs must be filed at Washington. An idea of the intensity of the fight is afforded by the fact that the normal rate, 72 cents per hundredweight from Mississippi River points to Denver, &c., is now reduced to 22 cents for the same service. The rate now made is the same from Chicago, St. Louis and Mississippi River points to Denver, &c., as it is from the same territory to the cities along the Missouri River, thus cutting out the jobbers largely represented by the Missouri Valley Hardware Jobbers' Association, so far as concerns carload commodities.

Recognizing the importance of the question to them this association met at the Coates House, Kansas City, September 10, and adopted the following resolutions:

Whereas, Notice has been received of reduction in rates on iron articles from Mississippi River points and Chicago to Colorado common points, affecting under the maximum rate rule all intermediate territory; and

Whereas, Such reduction in rates has had the effect of entirely destroying our differentials under Eastern points, thus enabling: 1, The Eastern jobber to do business to our disadvantage; 2, the Western jobber to distribute goods to the exclusion of ourselves; and

Whereas, Such conditions must necessarily be admitted as being inimical to the Missouri River jobbers; therefore, be it

Resolved, That the Missouri Valley Hardware Jobbers' Association hereby protest vigorously against continuance of present demoralized rates and request prompt restoration.

Resolved Further, That in event of failure on part of railroads to effect the desired restoration of normal conditions we respectfully urge immediate reduction to the Missouri River to the basis of 7 cents from Mississippi River and 12 cents from Chicago, and that no unnecessary delay be permitted in disposition of the subject.

When shippers in Chicago and Mississippi River territory can ship to Denver and Colorado common points as well as intervening territory as cheaply as to the cities along the Missouri it obviously gives the latter merchants no chance at all and calls for positive action by them in their own interests. The jobbers along the Missouri are offsetting this difficulty as much as they can by shipping their orders when possible direct from the original source of supply. What will delay the settlement of the difficulty at best is the existence of many contracts with Eastern shippers good until January 1, 1903. Pending, however, any such asked for return to regular schedules the Missouri Valley Association demand a reduction in the rates on iron products between Chicago, St. Louis, &c., and the Missouri River to a basis of 12 cents per hundredweight from Chicago and 7 cents from St. Louis. While the cut in rates at first only concerned the trunk lines it has now extended to the branches of the main roads. The trade will recognize

this condition as one that occurs almost periodically and is apt to continue for some time before the traffic managers get together again.

DOES IT PAY THE HARDWARE DEALER TO HANDLE PAINT?

BY A. M. P.

IN answer to the above question we should say yes most emphatically, and there are many logical arguments to back up our assertion.

It seems absurd to think that some Hardware dealers who are otherwise very progressive and in line with whatever tends to better their trade should allow business which by every natural right is theirs to go to such a foreign place as the drug store. If a man wants Bolts and Locks and Fire Grates and the thousand and one things in the building line for his house he doesn't go to the drug store for them, and why should it be necessary for him to go there for Paint, when Paint essentially belongs to the building trade, and therefore by every natural right to the Hardware dealer? If Hardware dealers generally were more fully alive to this fact there would be fewer druggists and other like merchants handling Paint to-day, and the enormous business that has been developed in this line in late years would be diverted to the channel in which it properly belongs.

In the old days, when Lead and Oil were the only forms in which Paint was sold, it is very true Paint was not a desirable article to sell. It was not a cleanly commodity; it required considerable investment in time, space and money to carry a stock that would be at all adequate to the requirements of any fair sized community; and it was more often the case than otherwise that the profit, if any, was far from commensurate with the investment and trouble involved.

But things are different to-day. Prepared Paint has come into the market, and it is one of the most profitable and desirable building trade accessories that a Hardware dealer can sell. It is brought to the store attractively labeled in neat looking packages; it requires very little shelf room; it presents a splendid appearance on the shelves, and instead of detracting from the general orderliness of a well conducted store lends a tone by its effective display and eye catching qualities, and it affords a margin of profit ranging from 33 1-3 to 50 per cent.

As an example of the profit that good prepared Paint affords the dealer: In a small town in Maine, a Hardware dealer, thoroughly progressive and systematic and up to date in everything, arranged his stock so that those articles which paid him the best margin of profit would be up in front of his store—the stock graduating toward the rear according as the profit on each line was lessened. When through with his arrangement his Paint stock was found to have the place of honor.

Then, too, there is no other line the Hardware dealer handles that is so well and so forcefully advertised as the leading brands of good prepared Paint. A Paint stock of a reputable maker brings with it advertising helps in the way of daintily designed display cards, well printed color cards, strong posters, &c., helps that do much not only to build up Paint business, but also by their general selling qualities to attract trade to the store that would unquestionably go elsewhere.

Some of the leading Paint makers are even going further and have organized a system of personal solicitation of the property owners by personal letters in the interest of their customers that in itself would be an inducement for Hardware dealers to consider seriously and long before they allow some indirect competitor in their town to get the benefit of it.

Unlike the days of Lead and Oil, a dealer in good prepared Paint is thoroughly protected from ruinous competition in his own locality by the protection which the agency plan affords him. Prepared Paint makers do not place their goods with every Tom, Dick and Harry in a town and then set them flying at one another's throats and slashing prices in the scramble to control the trade. On the contrary, when the agency is taken for any well-known brand of a reliable Paint manufacturer it is confined strictly to one dealer and it is certain that any effort that may be put into the sale of the goods will result solely to the credit of the agent or dealer and to no one else.

The number of Hardware dealers who are handling good prepared Paint is constantly increasing, and we hope the day is not far distant when we shall see the Paint business of the country under the control of the Hardware dealer, to whom by every logical right it belongs.

In one of the thriving Massachusetts towns there is a Hardware dealer who put in a stock of a well-known prepared Paint a little over three years ago. At that time he was not very sure that the Paint stock was a profitable investment. In the short time he has been selling Paint his business in it has grown to such proportions and his profit is so satisfactory he has even considered the handling of Paint exclusively. Of course that would be unwise, as the sale of Hardware helps the sale of Paint, and *vice versa*.

SILVER PLATED WARE AS HARDWARE.

BY A MERCHANT.

SILVER Plated Ware, and especially Silver Table Ware, can be successfully handled in the Hardware store. In almost every Hardware store Table Cutlery is sold, and customers can be easily educated to look for Silver Knives and Forks in the same store. There are few Hardwaremen to-day who are not selling some House Furnishings, and Silver Ware certainly follows very closely this line. Customers, when looking for House Furnishing Goods, can easily be shown Silver Ware.

During the past few years the sale of Plated Knives and Forks has greatly increased, and in no small measure they are taking the place of the plain steel goods, therefore the Hardware merchant, to keep up his business in this line, must add the Silver Plated Ware.

Silver Ware is exceedingly attractive to everybody. It can be very nicely displayed, and gives tone and finish to an ordinary Hardware store. If displayed well it always results in a ready sale. It is, of course, well known among the trade in general that it is not the articles that people go into the store and call for that sell to the greatest extent. It very often happens that the goods most sold are the ones that are well displayed, shown and advertised.

The sale of Silver Ware, if well advertised, will bring new customers to the store, and thus at once broaden the field for the Hardwareman.

Many merchants have entered this line, and have found that for the amount of energy spent on its display and advertising Silver Plated Ware has brought exceedingly good returns. Upon the sale of these goods the profit is larger than on almost any staple merchandise. The fact that there is a large variety of designs and styles and that new goods are constantly in demand enables the retailer to make a good margin of profit.

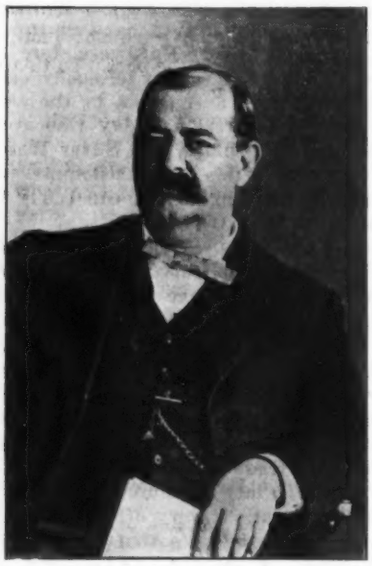
It is not essential in putting in a stock at first to put in a complete line. It would seem best to first add Plated Knives, Forks and Spoons, and as the business increases extend the line to cover Silver Hollow Ware, and in time add sterling goods so that the complete line would be covered. I.

WILLIAM R. GRAEF of Graef & Schmidt, 107 Chambers street, New York, sole agents in the United States and Canada for J. A. Henckels, Solingen, Germany, Cutlery manufacturers, has just returned from a six months' trip to Europe. A large part of his time abroad was spent at the factories in Solingen, where more than 2000 people are employed, urging forward goods for this market, in some classes of which, especially Scissors, it is difficult to get enough, owing to the great demand for expert grinders. A portion of the time, however, was spent in Switzerland, where, with Mrs. Graef, some of the snow clad mountains were climbed. Mr. Schmidt of the same concern also made the trip to Europe this summer, but returned earlier in the season.

DEATH OF FRANK WISWELL.

FRANK WISWELL was born in Philadelphia July 26, 1864, and died in the same city September 4, 1902. At the age of 16 years he entered the business world as an employee of the Western White Lead Company of Philadelphia, remaining with them for one year, at the end of which time he severed his connection to take a position with the Enterprise Mfg. Company of Philadelphia. Starting in their employ as a clerk, he filled various positions until 1885, when he started out on a trip to advertise their goods among the users. He showed great fitness for the position. His first trip, intended to be for several weeks, extended over a period of six months, at the end of which time he was in Chicago. By this time the company were thoroughly satisfied that through his efforts their business had received a great impetus and he extended his territory North, East, South and West, staying for a considerable period in the larger cities, but working systematically so as to cover the territory east of the Mississippi River.

In 1889 he assumed the position of direct traveling representative of the company, and remained in that



FRANK WISWELL.

position until his death. In this capacity he covered the entire territory of the United States and Canada, and through his unfailing integrity and regard for absolute truth he had the unbounded confidence of his employers, and to an equal extent the confidence and regard of the trade. In 1894 he conceived the idea of having a number of young men do the same kind of missionary work for the company that he had done in his early career, and after consultation with the officers of the company he secured their consent to a trial of his plan. Since then the company has repeatedly added to the number of men so employed. It was his belief that this systematic work in behalf of the dealers accounted very largely for the material increase in the business. Formerly it was his custom to make a six weeks' trip five times a year, but his method resulted in his being able to accomplish in two trips all that had formerly been done in five. During the time he was the company's representative he had the satisfaction of seeing his orders swell to five times the volume of his predecessor's best year. He had a wonderful knowledge of the field which the Enterprise Company covered, and an abiding faith in the merits of their goods. He was at all times a persistent advocate of the best processes of manufacture.

He was essentially a man of method, having command at all times of the details referring to the department of advertising, which he delighted to call their missionary field. He had trained a number of men to somewhat the same degree of excellence that he himself had attained, and he left the company in possession of the results of a life work devoted solely to their interests. His life should be a stimulus to those with whom he was in constant contact, and those who knew him best realize that his loss will be very keenly felt, not only by his business associates, but also by those who had social relations with him.

He was genial and generous, and in spite of his continued absence from home on business he had a most charming home life, the influence of which cannot fail to affect his widow and two boys whom he left just when he could see prospects developing before them.

E. C. ATKINS & CO.

DURING the past 12 months E. C. Atkins & Co., Indianapolis, Ind., have made the following improvements in their plant: The erection and completion of a large three-story building, 125 x 150 feet, having tempering shop on first floor and hand saw department on the second and third floors. Going up through the center of this building is a smoke stack 153 feet above the ground, 23 feet under the ground, making a total hight from foundation of 176 feet, the inside diameter being 10 feet, this stack making a draft for the boiler room as well as for the tempering furnace. They claim this tempering room to be the largest in the world. The company have also added two new 100 horse-power boilers, making a complete battery of ten. They have doubled the capacity of their machine shop and have made changes in and additions to the old building, where the tempering shop was formerly located, by practically making the building over and putting in a number of new power presses. There have been added three new drop forges and several machines for Hand Saws. There have also been quite a number of new machines put in in different departments of the plant for various kinds of work. They are now completing the erection of a large artificial fuel plant at an expense of $50,000. This building occupies about a quarter of a block and will be ready for operation about the middle of October. Excavation is also being made for their new office building, 75 x 40 feet, four stories high, to be located on the corner of South and Illinois streets. This will probably be completed by December 1, and they expect it to be of great benefit in facilitating the dispatch of their business. The first floor will be practically an extension of their present office and will contain the private offices of the officers of the company, as well as the accounting room for the cashiers' and bookkeepers' departments. The second floor will be the directors' room and the purchasing agents' office. The third floor will be occupied by the advertising department and printing presses. The fourth floor will be utilized as filing rooms for all statements, records, &c. The basement will contain lavatories, dressing rooms and large vaults for the storage of valuable papers. Altogether they expect to have one of the most complete and best equipped office buildings in the country. They will continue to occupy their present office building, using it for the order and billing departments, traffic manager, mail clerks, &c. The company advise us that the total cost of improvements already completed within the past 12 months is $75,000. Those now in the course of erection will cost about the same, making a total of not less than $150,000 for new buildings and equipment since July 1, 1901.

THE MICHIGAN BARREL COMPANY of Grand Rapids, Mich., have issued a circular to the trade announcing that their factory is now running full and that their capacity for manufacturing Refrigerators is 2000 per month. They call attention to the difficulties which it has been necessary for them to overcome because of the losses they sustained by fire July 18, 1901, and the delay in rebuilding, owing to trouble in obtaining machinery and material for manufacturing, and even after the resumption of work in February of this year they found competent labor very scarce and exacting. Hence their inability to make prompt shipments during last season. They are now, however, in position to make early shipments on orders received for next season.

TRADE ITEMS.

THE U. T. HUNGERFORD BRASS & COPPER COMPANY, 497-503 Pearl street, New York, have opened a branch office at 510 Arch street, Philadelphia, in charge of three of their most competent people who thoroughly understand the Brass and Copper business, for the purpose of increasing their sales in Philadelphia and surrounding territory. No stock will be carried at that point, but as they continually have on hand at their new headquarters in New York a well assorted stock of about 1,000,000 pounds, shipments of which can be delivered in Philadelphia and nearby points within 24 hours after receipt of order, they do not believe it will be necessary to carry a stock there.

PECK, STOW & WILCOX COMPANY, Cleveland, Ohio, announce that they are now ready to fill orders for the Locks, Knobs and Builders' Hardware formerly manufactured by Brittan & Mathes Company, Pittsburgh, Pa. It will be remembered that a few months since Peck, Stow & Wilcox Company purchased the patterns, dies, tools, &c., of the Brittan & Mathes Company. All the goods previously made at Pittsburgh will be manufactured at the Cleveland factory. The Peck, Stow & Wilcox Company say their aim will be to maintain and if possible improve the standard of the goods previously manufactured at Pittsburgh. They will also add new styles from time to time as the trade demands. The firm of Arthur Brittan & Co.—composed of Arthur Brittan and Geo. M. Lovelock—have been appointed exclusive selling agents for the line of goods previously manufactured by the Brittan & Mathes Company, Mr. Mathes remaining with the manufacturing department at Cleveland. An illustrated catalogue, pocket edition, has just been issued by the Peck, Stow & Wilcox Company, covering the line of goods referred to. The catalogue is designed for the jobbing trade only and is conveniently and systematically arranged so that jobbers can readily order from the lists published, the sizes, quality and prices of the various articles being specifically given.

C. W. HACKETT HARDWARE COMPANY, St. Paul, Minn., have changed their style to Hackett, Walther, & Gates Hardware Company. This change was made to recognize the services of Mr. Walther and Mr. Gates, and owing to the fact that Mr. Hackett to a large extent has retired it seemed the proper thing to change the style so that those who are in the active management should be shown by the stockholders the appreciation which they deserve. Mr. Walther has been with the house for 30 years and Mr. Gates for 17 years, and during all that time they have occupied very prominent positions, until in the last few years they have actually had the active management of the concern. There is no change in any other way, the officers continuing as before, as follows: C. W. Hackett, president; T. G. Walther, vice-president; H. B. Gates, secretary and treasurer, and J. C. Henry, assistant treasurer.

EDWARD MEYER, treasurer of the Russell & Erwin Mfg. Company, New York, sailed for Europe September 3, on a trip which was undertaken for pleasure and recuperation. He is expected back about October 1.

FRANCIS VAN WYCK, who has been in the employ of R. K. Carter, New York, syndicate buyer, for the last 22 years, nine or ten of which has been as a buyer, has become the secretary of the Hardware Jobbers' Purchasing Company, 102 Chambers street, New York. This company are purchasing agents and commission merchants, buying for the jobbing trade only. The business, established June 19, 1902, is incorporated. P. Doblin, the president, recently returned from a business trip through some of the principal New England and Canadian cities, coming back by way of the larger cities on the line of the New York Central Railroad. He found trade, as a rule, in good condition, with prospects of a large business this fall.

Moulton Mercantile Company have succeeded E. L. English in the Hardware and Agricultural Implement business in Moulton, Iowa.

Letters From the Trade.

Our readers are invited to discuss in these columns questions of trade interest connected with the manufacture or sale of Hardware. We shall be pleased to have a free expression of opinion on subjects deserving the attention of Hardware merchants and manufacturers.

Decline to Quote "Inside Prices."

Manufacturers and jobbers are undoubtedly in receipt constantly of letters asking for quotations and putting in a plea more or less direct and forcible for the lowest prices. It is often a delicate matter to know just how to meet this request or to determine the precise grade of prices which shall be named. Where quotations have previously been given without resulting business or where there is a suspicion that the prices named have been used as a lever to get lower prices from other manufacturers the request for inside prices is regarded with disfavor. In this connection there comes to us from a prominent manufacturer the copy of a letter recently written by him to a house who desired quotations and put in a plea for low figures, which in the manufacturer's opinion were not justified by the character of his business in the past. To this request reply was made as follows:

Replying to your inquiry of the 18th, a portion of which reads, "We are entitled to inside prices," we have quoted you since the latter part of 1898 and to the present date, not including quotation now made, six different times, at your request.

Your purchases from us in 1897 were $1.75 and in 1898 $33.75, and nothing since that date, and we ask why can't we sell you goods? When we quote you we quote the extreme price that commands a greater trade than any of our competitors are favored with.

Our lines of manufacture are more complete than any other manufacturers—that is, we manufacture in greater variety, suiting a greater field of wants, and still our quotations, though at your request, fall on barren ground, and we do not agree with you that you are entitled to best discounts, and quote for you regular prices, as follows, &c.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

Willcox Hardware Company, McRae, Ga., are opening up in business, handling General Hardware and Mill Supplies. They request copies of catalogues and price-lists pertaining to these lines.

John H. Eells has purchased the stock of the Williams Hardware Company, Pittsfield, Mass., and will continue the business under the name of the Berkshire Hardware Company. L. D. Andrews will be retained as general manager. The new firm would like recent catalogues in Hardware, Paint and Sporting Goods, with quotations.

Joe Michel has commenced the Hardware, Stove, Farming Implement, Sporting Goods and Plumbing Supply business in Spokane, Wash. Mr. Michael is erecting a new store, which will be of brick, 35 x 110 feet in dimensions, three stories high. Its completion is expected by January 1 next.

J. C. Turner, dealer in Hardware, Stoves, Agricultural Implements, Sporting Goods, &c., Sterling, Kan., has sold out to Houston Bros.

The Hardware store of Maltbie, Friel & Maltbie, Wilson Creek, Wash., has been damaged by fire to the extent of $4000. They are building a new store, 24 x 60 feet in dimensions.

ASSOCIATION MEETINGS.

The Retail Dealers' Hardware and Implement Association of Texas will hold its annual convention at Dallas, October 8, 9 and 10. The Dallas fair will be in progress at that time and the fair managers have agreed to set October 8 as Hardware and Implement men's day.

The annual meeting of the Retail Implement Dealers' Association of South Dakota, Southwestern Minnesota and Northwestern Iowa will be held at Sioux Falls, S. D., December 9, 10 and 11.

Other Implement dealers' associations will hold their annual conventions on the dates named as follows: The Iowa Implement and Vehicle Dealers' Association at Des Moines, December 2, 3 and 4; the Illinois Retail Implement Dealers' Association at Bloomington, December 9; Tri-State Vehicle and Implement Dealers' Association at Cincinnati, November 27, and the Montana Implement Dealers' Association at Helena, February 9.

BRITISH LETTER.

Office of *The Iron Age*, HASTINGS HOUSE, NORFOLK ST., LONDON, W. C.

The Week's Hardware Trade.

BEYOND an agreeable surprise that the exports have maintained their accustomed volume during the month of August, as shown by the Board of Trade returns, notwithstanding the fact that there was one less working day in August than in the previous month, there is but little to comment upon in the week's work. While there has been a slight advance in the exports of metals and articles manufactured therefrom during the month of August as compared with August of last year, yet there is a decrease of close on $2,000,000 as compared with August, 1900. The maintenance of the trade may, to a large extent, be put down to the necessary increase of supplies to South Africa. This will readily be observed when I state that Hardware to South Africa during the month rose from £10,181 to £17,746, that Cutlery advanced from £6640 to £11,270, that Wire went up from £6218 to £12,691, while, better than all these, Galvanized Sheets jumped up from £28,802 to £42,360. It will therefore be seen that, outside of South Africa, the export trade has, if anything, gone back during the last month.

The uncertainty of the Copper market is disquieting in the extreme. This week there has been a slight flutter and in consequence a few orders were received for Tubes, Sheets and Wire. But the advance was not maintained and orders in consequence promptly slackened. It is a pity that Copper is so unequal in price, as there is an excellent consumptive demand, particularly for electrical purposes. The Brass Foundry trades show some improvement, but the orders are mostly for stamped and machine made goods, with the result that the more highly paid and artistic work is starving. Whatever hammered iron work is required (generally in combination with copper) is for decorative purposes, especially Hearth Furniture, Gas Brackets and Flower Stands. There has been a brisk demand during the week for all kinds of culinary utensils and some very large orders have been received for Tea Kettles for export to colonial and South American markets. Beyond this, tin plate workers are only moderately busy in Kettles, Trays, Candlesticks and Tea Pots. The electroplate and Britannia metal trades are rather brisker than they have been for some time past and there is a growing demand for Spoons and Forks. Case goods are also selling well just now.

With the exception of the cases here cited, and perhaps one or two other departments, it cannot be said that the manufacturing Hardware trade is in a particularly good way. Orders from travelers are neither heavy nor varied, and I am still of the same opinion often expressed in these columns that before the year is out we shall experience a distinct slump in trade.

On overseas account Australian reports are more favorable, notwithstanding the drought, while South America is distinctly improving. We are gradually seeing daylight in South Africa, but nothing immediate is very promising. The demand for the best class of Locks continues good, but the common Locks are in poor request. On the export account the following particulars of the month's exports of Hardware and Cutlery show accurately enough the trend of things:

	Quantities—August		Values—August	
	1901. Cwt.	1902. Cwt.	1901.	1902.
Cutlery: To Russia	....	....	£108	£140
Sweden	....	....	59	98
Norway	....	....	....	106
Germany	....	....	1,250	1,965
Holland	....	....	148	217
Belgium	....	....	386	253
France	....	....	173	224
Spain and Canaries	....	....	301	173
United States	....	....	6,655	4,457
Foreign West Indies	....	....	449	424
Chile	....	....	757	674
Brazil	....	....	1,991	3,312
Argentine Republic	....	....	1,281	1,020
British South Africa	....	....	6,640	11,270
British East Indies	....	....	4,731	5,895
Australasia	....	....	9,943	13,112
Canada	....	....	4,241	5,181
Other countries	....	....	6,907	9,094
Totals	....	....	£46,020	£57,615
Hardware unenumerated:				
Russia	590	433	£3,815	£2,534
Sweden	340	274	1,934	1,593
Norway	362	304	1,810	1,510
Germany	1,887	1,307	11,359	8,033
Holland	1,468	1,612	7,881	8,760
Belgium	771	714	5,241	4,408
France	524	317	2,328	1,845
Spain and Canaries	321	404	1,297	1,805
United States	432	651	3,072	4,127
Foreign West Indies	327	177	1,172	825
Chile	316	423	1,754	2,076
Brazil	480	612	1,937	2,916
Argentine Republic	417	212	2,181	1,228
British South Africa	2,265	3,950	10,181	17,467
British East Indies	2,632	2,852	12,052	14,667
Australasia	5,324	4,280	23,840	20,427
Canada	307	543	1,492	2,664
Other countries	4,939	5,914	21,868	26,307
Totals	23,702	24,979	£115,214	£123,192

Crucible Steel.

In regard to crucible steel from Sheffield, the following comment upon this branch of trade may prove useful:

With few exceptions there is not enough to keep a night as well as a day shift going. Some houses, more favorably situated, have just recently been in receipt of such good lines that they have had to start more holes. Although the South African trade has not improved as was at one time confidently expected, a few firms who have been longest in the market, and whose productions are well known, are doing better. They have been in receipt of further good orders, but as compared with what it was before the war business is dull. There have been no changes in prices, but it is generally understood that, owing to the difficulty experienced in procuring raw material and the high cost of coke and coal there would follow upon a more active demand an upward movement in quotations.

American and English Methods.

I have recently had as visitors in this office a number of prominent American business men, who have been over here, some on pleasure, some on business, some combining the two, and I do not hesitate to say they are returning a little chastened. They have one and all learned that English buyers expect regular supplies when once business has been started. As a proof that this irritation exists I quote from a letter from a firm of Birmingham merchants. Speaking of the lack of consideration American manufacturers show their English customers, they say:

They want foreign orders when it just happens to suit them, and they are not prepared, like manufacturers here or on the Continent, to show consideration for their customers and to cater for their wants continually. If they happen to be busy for the home trade they do not want foreign orders, and their customers can simply wait until it suits them again, managing meantime as best they can. We have just had a particularly bad instance of this, in which a large manufacturer, after writing to us urgently to introduce business and giving us considerable trouble, has now refused the opening orders. As owing to the nature of the case about four months elapsed since the correspondence was opened, it meanwhile happened that this manufacturer became

very busy for the home trade. An extract from his letter will fully explain his method of looking upon the matter. He says: "We wish to say that at the present time we are so very much rushed with orders from our home trade that we do not feel the agreeableness of doing business with outside countries. We trust that this explanation on our part will not inconvenience you any." Further comment is needless; but as our experience of local manufacturers is one of very long standing, and while we do not wish to minimize their faults, we also know that they have some sterling qualities, we venture to ask traders not to be misled by American tall talk, but to endeavor to keep a little more trade in this country instead of being so ready to play into the hands of their most formidable rivals, whose lack of consideration is notorious.

As I have repeatedly drawn attention to this subject, I am not sorry to put in an outside witness.

Steel Forks.

I reported a week or two ago about the question which had arisen in Sheffield as to when is a Steel Fork not a Steel Fork. It will be remembered that the Cutlers Company took action against a Sheffield manufacturer who advertised Steel Forks when, as the Cutlers Company contended, the Forks were not steel, but really malleable iron. The magistrate adjourned the case to look up the subject and proceeded to consult the authorities. He went first to the Encyclopædia Britannica, and having accepted the definition there as his standard, he called in the aid of two practical experts. These gentlemen tested and reported on five out of the seven Forks submitted to them. The net result of their investigation was that on the facts the metal was of a very low grade steel. The stipendary magistrate came to the same conclusion, and I dare say the correct one. Annandale defines steel as "iron combined with a small portion of carbon, capable of showing great hardness and elasticity." The Century defined steel as "a modified form of iron." There is evidently plenty of room for difference of opinion as to what constitutes steel. Meantime, we may note that Forks, if they meet the very easy tests submitted by the magistrate, may be sold in this country as steel without infringing the law in respect of trade-marks.

Hardware and Metals to Chile

I have just received the new classification of Chilean imports. Class 3 includes fine metals, Jewelry, Iron, Steel, Axles, Wire, Pipes, Tubes, Nails, Tin, Lamps, Steel Wheels for railway carriages and trucks and other items. Of these the most important from the point of view of readers of *The Iron Age* are as follows. The figures are set out in Chilean dollars, which may roughly be valued at 36 cents, and there is an asterisk against those lines showing an increase on the previous year's trading:

Iron and Steel.	
Articles of domestic use, iron and steel	246,139
Iron or steel manufactures	1,387,051
Wire manufactures	118,615
Steel, unworked	523,676
Wire	1,001,189
Hoops	107,061
Hinges	96,932
Wire cables	86,982
Piping and tubes	827,555
Bedsteads	165,403*
Locks and Keys	113,108
Stoves	90,631
Knives and Forks	152,045
Wire Nails	626,653*
Iron, in ingots	291,362
" unworked	1,437,899
" in sheets	357,549*
" " galvanized	129,509*
" grooved sheets, galvanized	1,212,086*
Common tin	220,096
Rails	1,905,904*
Wheels	1,195,308
Screws	158,822
Other Metals.	
White metal articles	103,387
" " " gilt or silvered	201,669
Piping and tubes	323,722
Capsules for bottles	154,540
Bedsteads	72,794
Zinc, in bars, plates or sheets	196,301*
Copper, in plates or sheets	146,882
Spoons	86,003
Sham jewelry	87,263
Printing type	95,352

HARDWARE STORE WINDOW DISPLAY.

BY SAM HOLDER.

ONE of the show windows of a Hardware store should be inclosed and made perfectly tight for the protection of Cutlery and other easily damaged goods. The partition separating the window space from the store proper should be of plain glass, so as not to shut off a view of an inviting interior. Mirrors on the back and side extending up about 30 inches from the window floor add much to the appearance of an inclosed window. A large wall case about 2 inches deep and filled with a good showing of 200 or more Pocket Knives may be placed above the mirror on the side of this window and will make a permanent and profitable display without injury to the goods.

Show Goods to Sell.

Whether placing your goods before the public in the columns of a newspaper or in a show window select articles that you want to sell and for which there is a demand, or for which you can create a demand, and put them before the public in a straightforward way, telling the price or any particular advantage they may possess. Neither fanciful or grotesque displays will pay.

A good window of finishing Hardware can be arranged by filling it with Locks, Escutcheons, Butts, &c., of the same design and finish as sold for the leading new buildings. Cards should state where the goods are used and call attention to special features. Sketches of some of the buildings in course of erection may be placed in the window to good advantage if they can be obtained.

Figures in the Window.

People working in windows or dummies representing them can be used occasionally when they directly advertise the goods for sale and are not calculated simply to draw a crowd. For example: During a very popular course of cooking lectures in our town we placed a kitchen table in the window and had a man dressed as a *chef* showing a new Food Chopper. Baskets of different vegetables, crackers and meat were placed in front of the table and the facility with which they were chopped, together with other advantages, were shown to the ladies who overcrowded our store every afternoon. Racks of kitchen specialties, principally those used in the cooking school, were placed around the window. We not only advertised in the papers, but gave each lady attending the lectures a small advertising blank book with pencil attached for writing receipts, &c. This exhibit sold several hundred of the Choppers in the five days, besides many other cooking utensils, and has greatly increased our trade in both.

Price Cards.

Neat price cards should be used freely, not alone on cheap goods on which you are making a special price, but on the best goods. Pictures, if bearing directly on the goods for sale, often add much to a display. For example, a large cartoon, taken from an illustrated paper, of the President and several foreign rulers seated around a beautifully browned turkey, was mounted on a card advertising a window filled with a new kind of Roasting Pans, and assisted in selling many dozens of the Pans.

Customers are aided in selecting seeds, especially flower seeds, if the cards placed in the boxes of bulk seeds have either a colored picture, which can be obtained from seedsmen, pasted on them, or a water color sketch of the flower.

By authority from the Secretary of State of Illinois the American Tank & Fixture Company, Chicago, have changed their name to Acorn Brass Mfg. Company and increased their capital stock from $50,000 to $200,000. The company have acquired the property and good will of the Acorn Brass Works, assuming all indebtedness, and will continue the business of the constituent companies at 51 North Peoria street, Chicago. Since May 1 the Acorn Brass Works have been occupying much enlarged quarters on Fulton street, extending from Green to Peoria.

RECORD OF PRICES.

FOR keeping records of prices Rider & Cotton, Portsmouth, N. H., use the card system, one of the cards being illustrated in the accompanying cut, reduced in size. The actual size of the cards is 3 x 5 inches, ruled and lettered as shown. The name of the article is written above the columns, which provide space for the date of purchase, name and address of the parties from

ARTICLE Hinges SIZE OR KIND T Heavy

DATE	NAME AND ADDRESS	PRICE AND TERMS	BILL	LET	REMARKS
4/30-00	B & D.	70-10-10-10	X		
4/25-01	"	66⅔-25	X		Too High.
4/27-01	Standley	70-25	X	Verbal X	
4/28-01	B & D.	70-25	X		
10/9-01	"	66⅔-25	X		Too High.
11/8-01	"	80-25	X	Verbal X	
2/4-02	"	80-25-10	X		

Record of Prices.

whom the goods were purchased, price and terms. For the purpose of looking up the source of prices the two columns are used, headed Bill and Let.—the latter standing for Letter—so that looking through a number of back bills may be avoided when the price had been obtained by letter and no order given for goods. If prices are given by salesmen or are received from other sources, the remark column is used. This system has been used by the firm with entire satisfaction.

PRICE-LISTS, CIRCULARS, &c.

THE IOWA FARMING TOOL COMPANY, Fort Madison, Iowa: Catalogue for the season of 1903. The goods illustrated include Snaths, Cradles, Forks, Hoes, Rakes, Hooks, &c. The catalogue is an attractive one of 130 pages and represents the extensive line of goods of this class which the company are manufacturing. The frontispiece is a fine view of their plant, in which nearly 250 hands are employed.

EMPIRE KNIFE COMPANY, Winsted, Conn.: An attractive catalogue of nearly 50 pages, showing their full line of Empire Pocket Knives. They refer to the complete and serviceable manner in which this catalogue is gotten up, making it especially adapted for the use of salesmen on the road, where samples cannot be shown. They will be pleased to mail a copy to the trade on request.

THE NARRAGANSETT MACHINE COMPANY, Providence, R. I.: Lockers and Wardrobes. These are shown in a catalogue in wood and steel, the company furnishing the latter to a large number of factories here as well as in England. The company will be pleased to submit estimates on any desired style not shown in the catalogue. Another catalogue is devoted to Bowling Alleys, a field in which they have had 16 years' experience.

WESTERN TUBE COMPANY, Kewanee, Ill.: The Kewanee Combination Brass and Iron Ground Ball Joint Union. A circular illustrates the Union, the thread end of which is brass, the ring and bottom end being malleable iron, thus making the screw connection with different metals.

W. N. DURANT, Milwaukee, Wis.: The Durant Counter. A pamphlet gives a list of recent sales of these counting machines, two-thirds of which were made the first six months of this year. During this time the Counters have gone to almost every State and to some foreign countries.

JESSE JONES PAPER BOX COMPANY, Philadelphia, Pa.: Catalogue devoted to illustrations, descriptions and prices of a large variety of Boxes for the use of confectioners, &c. This company have also for many years manufactured a line of Shelf Boxes for the use of the Hardware trade.

F. L. TURNER & Co., Orange, Mass.: Fine Mechanical Tools. An illustrated circular describes crucible steel blade mechanics' Try Squares, Squares with sliding blades, Calipers for use where large scope is desired and Depth Gauges.

THE PETERS CARTRIDGE COMPANY, Cincinnati, Ohio, are distributing "The American Rifleman's Encyclopedia." This is an interesting book of 137 pages, containing a collection of terms used by American riflemen with definitions of the same, records of all the international and national matches in which riflemen of the United States have taken part and other valuable matter.

THE D. M. STEWARD MFG. COMPANY, Chattanooga, Tenn., and 2 and 4 Stone street, New York: Export catalogue and price-list relating to Slate Pencils, School and Metal Workers' Crayons, Lava Electric Insulators, Lava Gas Tips, Acetylene Burners, &c.

NICHOLS BROS., Greenfield, Mass.: An illustrated catalogue and price-list devoted to Knives, Carvers, Steels, Saw Blades in coils, Ham Stringers, Tryers, Butter and Lard Spades and Trowels, Scrapers, Cotton and Tobacco Knives, Corn and Beef Topping Knives, &c.

DEXTER CURTIS COMPANY, Madison, Wis., also Birmingham, England: Circulars illustrating Collar Pads and Ankle Boots for horses. These goods are shown in a variety of styles, made of various materials.

CANADA HORSE NAIL COMPANY, Montreal: Revised price-lists of Horse Nails, adopted August 1, 1902.

WHEELING STAMPING COMPANY, Wheeling, W. Va.: Catalogue No. 3, illustrating Lanterns, Lamp Burners, Screw Taps, &c. The company make metal specialties along these lines to order. The early pages of the catalogue are devoted to a new line of Lanterns, the special feature of which is the one-piece stamped tube, each side of the tube being drawn from one piece of tin, joined at the edge by a seam, no solder whatever being used.

THE PHENIX MFG. COMPANY, Milwaukee, Wis.: Circulars illustrating Screens, Awnings, Reversible Windows, Storm Sash and Window Screen Hangers, Screen Doors and Portable Houses, the latter being a line which they have recently taken up.

BURLINGTON VENETIAN BLIND COMPANY, Burlington, Vt.: Catalogue illustrating Patent Inside Sliding Blinds, Patent Improved Venetian Blinds, Window Screens and Screen Doors.

RICHMOND CEDAR WORKS, Richmond, Va.: Catalogue relating to Washing Machines, which are shown in a number of different styles. They state that their Machines are all hooped with electric welded galvanized wire hoops, which are imbedded by a patented process into grooves in the tub, clamping the staves so tightly that it is impossible for them to fall off.

THE WILLIAMSPORT STAPLE COMPANY, Williamsport, Pa.: Catalogue of Saddlery Specialties, including Winkers and Blinds, Loops, Buckles, Harness and Breeching Rings, &c.

AMERICAN RAILWAY SUPPLY COMPANY, 24 Park place, New York: Illustrated catalogue of supplies for Railroad and hotel men, such as Baggage, Hotel and Pay Checks, Number Plates, Tokens, Medals, Breast and Cap Badges, Buttons, and various kinds of stamped and embossed metal work of which they are manufacturers. They also deal in Numbering Machines, Dating Stamps, Registers, Seal Presses and Seals, Trucks, Lanterns, Punches, Mail Bags, &c.

GREENE, TWEED & Co., 17 Murray street, New York: Illustrated catalogue, envelope size, describing the improved Pony Rochester Automatic Lubricator for steam vehicles.

BARNEY & BERRY, Springfield, Mass., for whom Walter B. Stevens & Son, 114 Chambers street, New York, are representatives for the metropolitan district, carrying a large stock, have just issued their illustrated catalogue of Ice Skates for the season of 1902-3. These Skates are now made with ribbed runners as well as plain runners in the various styles of regular and special fastenings.

WROUGHT WASHER MFG. COMPANY, Milwaukee, Wis.: Catalogue of Wrought and Steel Plate Washers, which are manufactured in any thickness or any desired size.

F. E. MYERS & BRO.'S CATALOGUE.

F. E. MYERS & BRO., Ashland, Ohio, have just issued catalogue No. 37, containing 352 pages. This illustrates with list prices the firm's extensive line of Pumps, Hay Tools, Door Hangers, &c. The catalogue, with the exception of half a dozen pages devoted to Pump Tools and Fittings, is devoted exclusively to goods of their production, including a number of new articles. The catalogue will be sent to all of the firm's customers, which they refer to as numbering over 10,000 in the United States, while they also have accounts covering 25 foreign countries. In view of the growing business increased facilities will be provided during the coming year.

THE SEWING MACHINE CONSOLIDATION.

WE are able to state upon the authority of the National Sewing Machine Company, Belvidere, Ill., that while a combination of various Sewing Machine manufacturing interests has been contemplated for some time, it has not yet been consummated. Negotiations are, however, in progress, the result of which will be duly announced in our columns.

Officials of the White Sewing Machine Company and the Standard Sewing Machine Company, both of Cleveland, deny the report that they have agreed to enter a combination with other manufacturers, or that they have given options on their plants. President T. H. White of the White Sewing Machine Company states that within the past five years his company have been approached repeatedly by promoters endeavoring to arrange combinations, but they have never given them any encouragement.

AMONG THE HARDWARE TRADE.

Wilbur Clark has removed his stock of Hardware, Stoves, Tinware, &c., to a new block in Imperial, Cal., which is located in the middle of what used to be called the Colorado desert and is 70 feet below sea level. Mr. Clark's store is the first Hardware emporium in the former desert.

Simpson Hardware Company, capital $25,000, have been organized at Williamstown, N. C., by J. Paul Simpson, George W. Newell and others. They will do both a wholesale and retail business, handling Shelf Hardware, Stoves, Tinware, Agricultural Implements and Sporting Goods. They are starting in with a $5000 stock.

J. A. Boles & Co. have disposed of their Hardware, Stove and Sporting Goods business at Woodbine, Iowa, to Nickel & McEwen.

Wesselink & Boeyink have succeeded Sneller & Wesselink in the Hardware and Stove business in Sioux Center, Iowa.

Hess Bros. are successors to Hess & Fruit, who succeeded Fruit Bros. in the Hardware business in Mounds, I. T., a short time since.

Dowling & Grantham have succeeded Bressler & Hurst in the Hardware, Stove and Agricultural Implement business in Gentry, Mo.

Milroy & Johnson have succeeded G. W. Collins in the Hardware, Stove and Agricultural Implement business in Hopkinton, Iowa.

Carlson Bros. have sold their Hardware, Stove and Farming Implement business in Lake Preston, S. D., to Olston & Thorsnes, who will take possession December 1 next. Mr. Olston has been identified with the sale of Farm Implements for several years past.

H. M. Quinn has purchased the Hardware, Stove, Agricultural Implement and Sporting Goods stock of J. M. Sprague, Mapleton, Minn.

Bugbee & Goss have retired from the Hardware business in Mound City, S. D.

A. E. Luedke has bought the Hardware stock of Joseph Bauer, at Fergus Falls, Minn., and will remove it to his block, where with materially larger facilities he will continue the wholesale and retail business. Mr. Luedke will also put in a stock of Sash, Doors, &c.

L. Stannus and R. H. Olcott, partners in the firm of Stannus & Olcott, Orofino, Idaho, have dissolved partnership, Mr. Olcott retiring. Mr. Stannus will continue the business under his own name.

Grimes & Epting are successors to Grimes & Watrous in the Hardware, Stove, Tinware, Farming Implement, Sporting Goods and Seed business in Burlington, Kan. They have erected a new warehouse of brick and stone, 25 x 80 feet, two stories, and will also erect a new store building, 35 x 105 feet, two stories, likewise of brick and stone, with plate glass front. They have purchased the lot on which the new building will stand and already have some of the material on the ground.

Johnson & Peterson, Hector, Minn., were recently damaged by fire to the extent of $1500, fully covered by insurance.

Waite Bros., Miller, S. D., have purchased the building and Hardware stock of Beasom & Co., doing so for the purpose of securing their real estate holdings, it having been necessary to buy their entire plant to do this. The stock has since been sold to D. P. Cree, Hardware merchant, who will occupy the above building for the present. W. G. Redmond & Co., who sold out to Mr. Cree last spring, are again putting in a stock of Hardware at their old stand.

Fred. Chenoweth has purchased the Hardware stock of A. C. Nobes, Urbana, Ill., and will continue the business.

A fire which broke out in a stock of Oakum in the basement of Watson Bros.' Hardware store in Marinette, Wis., on the 2d inst., caused a loss of about $17,000 and wrecked the interior of the building. The following morning the concern with characteristic courage were doing business again in temporary quarters just across the street from the scene of the fire. The loss was about covered by insurance, which has been satisfactorily adjusted, and the remodeling of the old store is going on, the expectation being that the firm will again take possession of it shortly before October 1. The firm are dealers in Hardware, Farm Machinery, Lumbering Supplies, Iron and Steel, Wind Mills, &c., with a department also devoted to heating and roofing.

C. Lane & Co. have disposed of their stock of Hardware at Gibson City, Ill., to Ullery & Jones, who will remove the goods to their own store.

W. A. Barry is successor to Barry Bros. in the Hardware, Stove and Tinware business in Downs, Kan.

W. B. Miller, Hardware dealer, Alden, Iowa, has sold out to W. R. Cox, who has taken possession.

Colton & Hall have dissolved partnership in the Hardware and House Furnishing Goods business in Boonville, N. Y. C. W. Colton will continue at the old stand.

W. E. Parks has purchased the Hardware, Stove and Tinware business of Holman Bros., Marceline, Mo.

R. M. Crow has opened up in the Hardware and Harness business at Prague, O. T.

Coddington & Bauman have bought the Hackett Hardware and Stove establishment in Tuscola, Ill.

Johnson-Davis Hardware Company have succeeded Johnson Hardware Company in Sparta, Mo.

M. W. Bankson has succeeded W. H. Chambers Company, Hardware merchants, Barnesville, Ga.

Petty & Snyder have purchased the Hardware, Stove, Tinware, Agricultural Implement, Sporting Goods, Wagon, Buggy, Harness and Paint business of H. O. Alspaugh in Cowgill, Mo.

J. B. Meharg & Co. have succeeded H. L. Nemeyer in the Hardware business in Verdon, S. D.

Pennington & Johnston have lately embarked in the general Hardware business at McLoud, O. T.

H. M. Bailey, who was for some years with the Mayberry Hardware Company, Birmingham, Ala., and for about three years their secretary, opened a Hardware store under his own name in Sheffield, Ala., a few months since. He carries a full line of Shelf Hardware, Cutlery, Sporting Goods, Fishing Tackle, with China, Glass and Tinware. He also handles Stoves, Wagons, Buggies and Harness, with Sash, Doors, Paints and all other Builders' Supplies.

Wild Bros., Evergreen, Ala., have been succeeded by Wild-Jackson Beaven Hardware Company, who will continue the wholesale and retail business in Hardware, Stoves, Tinware, Sporting Goods, Farm Implements, &c.

The Danbury Hardware Company, Danbury, Conn., have removed to new quarters in the Andrews Block. The new location gives the firm nearly four times the floor space of the former store, permitting them to carry a much larger stock and make a finer display of their different lines. The main floor is given up to Builders' Hardware, Mechanics' Tools, Electrical Supplies, Camera Supplies, Cutlery, Chandeliers and Gas Fixtures, Ranges, Kitchen Utensils, Heavy Hardware, Glass and Paints, House Furnishing Goods, &c. On the second floor are the stock of Farming Tools, while the plumbing shop is in the basement. This is a large shop, 80 feet in length. The front part of the basement will be devoted to a Stove repair department.

Leander Bolton, Incorporated, dealers in Shelf and Heavy Hardware, Sporting Goods, &c., Des Moines, Iowa, are making a number of important improvements in their establishment, including a new front.

F. M. Gardner & Co., dealers in Hardware, Stoves, Tinware, Sporting Goods, &c., Hawarden, Iowa, have been succeeded by F. F. Chladek, formerly of Tabor, S. D.

Theodore Lyon of Westford, Conn., has purchased a half interest in the retail Hardware business of Harvey Chapman, Stafford Springs, and the style is now H. Chapman & Co.

W. P. & T. O. Brown have succeeded D. B. Ashbrook in the Hardware, Stove, Farming Implement and Sporting Goods business in McFall, Mo.

MISCELLANEOUS NOTE.

The Phenix Portable Houses.

The Phenix Mfg. Company, Milwaukee, Wis., have taken up the manufacture of portable houses for hunters, campers, automobiles, contractors, voting precincts, golf links and many other purposes. The houses are referred to as being strong, durable, wind and water proof, easily put up and taken down, light in weight for transportation, neat in design and reasonable in cost. The houses are folded for transportation.

The Wallace Jacks.

The Wallace Supply Company, 610 Garden City Block, Chicago, have brought out a line of jacks, as shown in the accompanying cuts. The jacks are small, the smallest size is known as the Baby jack, weighing only about 8 pounds, with an adjustment of from 9½ to 19 inches high. The jack being made of malleable iron and steel is referred to as being capable of lifting from 800 to 1000 pounds with ease. The neat and compact manner in which these jacks are gotten up is alluded to as making them especially desirable for tool kits in an automobile, and valuable in the event of a break down or if a wheel should get into a rut. The jack shown in Fig. 1 is their ball bearing automobile jack. This is made in several sizes with lifts of 10 to 15 inches, 12 to 19 inches, 16 to 27 inches, &c. The jacks are furnished in almost any required capacity, from 1000 pounds up to 10,000 or 12,000 pounds. The jacks are all compact, as the levers fold down out of the way when not in use. The head of jack is drawn up to place under the load to be lifted, and is held there by a pawl engaging the teeth in the adjusting bar which is made of steel. The load is then raised by means of the screw on top, which can be worked either up or down by simply turning the small adjustment wheel shown at the top of handle. In Fig. 2 is shown jack No. 6, with two steps, designed for steam, electric and street railway

Fig. 1.—The Wallace Ball Bearing Automobile Jack.

Fig. 2.—The Wallace Jack No. 6.

service, being used in track construction, also as a car jack in cases of emergency, such as derailments or accidents where cars have to be lifted quickly and lowered gradually. The rack with steps can be easily detached and gives a complete lifting jack, adjusting from 14½ to 23 inches, with a capacity of 12,000 to 14,000 pounds. The combined weight of the jack and rack is only 35 pounds, which, it is remarked, makes it a very convenient jack to handle considering its great capacity. It is made of the best malleable iron and steel, and head fitted with ball bearings. The Baby jacks are made in two sizes, designed for light vehicles and the smaller types of automobiles. The ball bearing jacks are made in seven sizes, with adjustments ranging from 10 to 32 inches, to raise from 1500 to 14,000 pounds.

The Daisy Automatic Weather Strip.

The Matthias-Wagner Company, Cedar Falls, Iowa, are offering the automatic weather strip for doors shown herewith. It is made entirely of galvanized iron with brass hinges and fastened to the door, and when the door is closed the lower leaf of the strip comes down over the threshold upon the door sill, as in Fig. 1. When the door is opened the strip automatically lifts up out of the way, as in Fig. 2. By the use of a wood screw, it is explained, screwed into the door frame where the push rod strikes, the fitting down of the lower leaf to the

door sill can be regulated to a nicety. The strips are reversible, to be used on doors opening either to the right or left. The strips may be painted to correspond

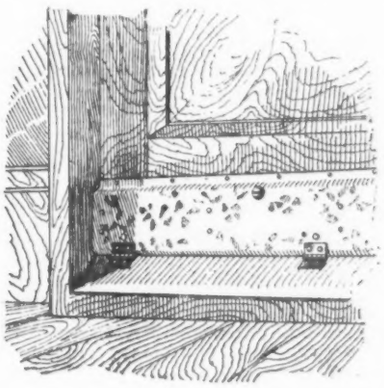


Fig. 1.—The Daisy Automatic Weather Strip.

with the color of the door. Among the points of excellence claimed for the strips by the manufacturers are the following: That they keep the floors warm and

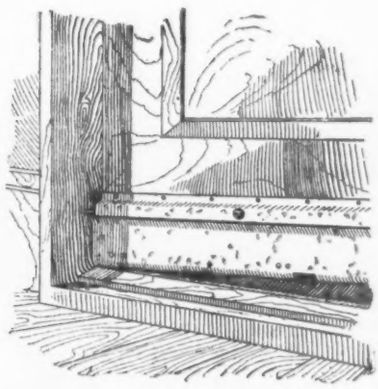
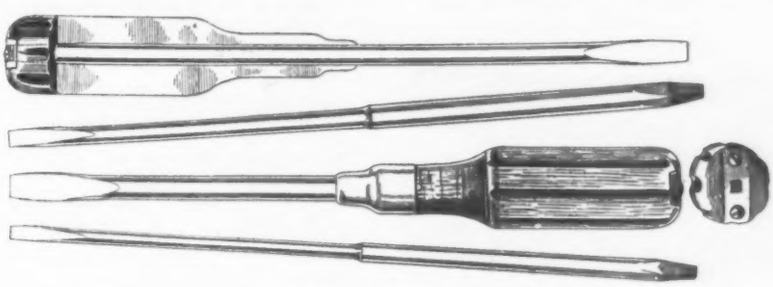


Fig. 2.—Strip Automatically Lifted.

dry; that they save fuel and carpets; that they prevent thresholds rotting, and that they are neat in appearance, simple, durable and easily applied.

Fairchild Changeable Screw Driver.

Meriden Mfg. Company, Meriden, Conn., have just put on the market the Fairchild adjustable screw driver, as here illustrated. The top cut of the group is a sectional longitudinal view showing the interior construction. This tool consists of a handle and three screw driver blades. The handle is of hard wood, fluted and ebonized, 6 inches long and 1⅜ inches in diameter at the widest part. On one end is a graduated steel ferrule

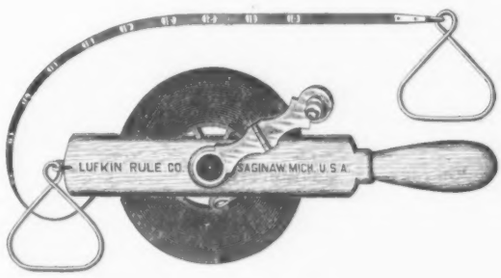


Fairchild Changeable Screw Driver.

1½ inches long. Mortised into the opposite end, as seen in the cross section, is a strong metal plate, in the center of which is a rectangular hole 3-16 inch square to receive one end of the blade and keep it from turning when used. The blades, about 12½ inches long, are variously ¼, 5-16 and ⅜ inch wide and suitable for driving a wide range of screws. They are made of the best quality tool steel, tempered and warranted by the manufacturers to neither break nor bend. There are no nuts, thumb screws or other devices to get out of order, a blade being easily removed by simply striking the back of the handle a smart blow, when the blade can be withdrawn and another one substituted. These screw drivers are put up one each in a neat telescoping pasteboard box.

Surveyors' Chain Tape.

The Lufkin Rule Company, Saginaw, Mich., New York branch in charge of H. G. Hollis, 280 Broadway, have just put on the market an improved form of surveyors' chain tape, as here shown. The steel ribbon is specially rolled and is ¼ inch wide, the graduations on one side being at intervals of 1 foot, except at each end, where for a distance of 1 foot the graduations are in tenths or twelfths of a foot, tapes with tenths being standard and furnished unless otherwise specified. An important feature of this tape, to which reference is made, is the marked mechanical progress made in the method of recording plainly and legibly the divisional figures. Each figure is etched on the bright polished surface,



Surveyors' Chain Tape.

after which, with the exception of a space about 1 inch long at the figures, the balance of the material is removed to a depth of three gauges in a very workmanlike manner, leaving the bulk of the tape surface a satin finish, which contrasts finely with the bright figure sections, at the same time making the tape more flexible and elastic. Such tapes in the past have been made in different ways, one of which was to rivet the figures at the proper points. Another process, crude at best, was to drop portions of suitable metal on the tape where needed on which to mark the graduations, both methods making the tape when reeled larger and more clumsy. The tapes are now made in 100, 150, 200 and 300 foot lengths, the dimensions of the 100-foot size, here described, being: Wood frame, natural finish, 12½ inches long; diameter of tape circle, reeled, 5¾ inches; triangular handles, 2¾ inches each way, with a skeleton metal center on which to reel the ribbon when not in use, 2⅝ inches in diameter. In the field the tape is entirely removed from the frame, which is only a vehicle for conveniently carrying it about, and the two handles, made like split rings, secured to the loops riveted to each end. On the end of the frame are two small perforated pivoted brass plates for attaching the handles when not in position on the tape, which also makes a convenient way of carrying the whole apparatus. The folding or hinged handle, open, is 3½ inches long, giving a good winding power. The mountings are nickeled brass. The tapes are sold complete, as illustrated, or tapes only with the two split ring handles, in the latter style at a much lower price.

The Triumph Hame Fastener.

The Bridgeport Chain Company, Bridgeport, Conn., are introducing the hame fastener shown herewith. In Fig. 1 the double hooks are shown, which are to be closed into the hame loops, as illustrated in Figs. 2 and 3.

Fig. 1.—The Triumph Hame Fasteners.

The locking lever is then inserted into such a link as will draw the hames taut, as in Fig. 2. A sharp pull on the end of the lever is then given to draw it into place and lock the hames, as in Fig. 3. In the manufacture of

Fig. 2.—Fastening the Hames.

this article the company use their No. 3-0 Triumph chain, which they claim has twice the strength of welded chain of the same size and is much stronger than the best 1½-inch strap, which it will outwear many

Fig. 3.—The Hames Fastened.

times. The point is made that the fastener is simple, that there are no screws, rivets or springs to give trouble, and that hames are fastened and unfastened in one-tenth of the time required when a hame strap is used. The fastener is referred to as fitting any hame.

B. Goertzen, Hardware merchant in Henderson, Neb., has sold out to H. Regier.

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